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OBSERVATIONS ON BONE FORMATION IN THE ABDOMINAL WALL FOLLOWING TRANSPLANTATION OF THE MUCOUS MEMBRANE OF THE URINARY BLADDER*

A PRELIMINARY REPORT

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BONE formation in abdominal wounds is a rare phenomenon. The literature of the subject was reviewed by Sir Arthur Keith[1], in 1927, who found only 36 cases. An interesting feature of his survey was that 34 of the 36 cases occurred in the supra-umbilical area. Most of these cases occurred after simple laparotomies. One came on following an operation for subdiaphragmatic abscess. To quote directly from Keith: "A survey of all these recorded cases shows us that the laparotomy scars in which bone is formed involve the supra-umbilical region of the two recti, the linea alba and the region crossed by fibrous intersections; that bone arises in the deep and upper part of the scar, often at several points, which unite as they grow; they occur fifteen times more frequently in men than in women, and in men over thirty more frequently than in men under thirty." Kretchmer[2] reported a case of bone-formation in the fistulous tract following supra-pubic prostatectomy. He regarded it as a case of myositis ossificans. Silver[3] reported a case of extensive bone formation in a right paramedian incision following cholecystectomy. Our interest in the subject was aroused when a private patient of one of us (A.C.A.), developed an extensive sheet of bone in his abdominal scar following a two-stage prostatectomy.

CASE REPORT

R. B., a white male, aged 51, was referred to Dr. Abbott by Dr. Cecil Taylor, suffering from the characteristic symptoms of well advanced prostatism. After thorough investigation, prostatectomy was advised. He was admitted to the Winnipeg General Hospital on July 5, 1930. On admission an indwelling catheter was inserted. Five days later a preliminary suprapubic cystotomy was done under local anæsthesia.

On July 16th, the prostate gland was removed. Nitrous oxide anæsthesia was used. The patient had a most uneventful convalescence and left the hospital 14 days after the second stage with the wound completely healed. During the last three days in hospital he complained of a small indurated mass in the lower end of the incision. This was thought to be a localized area of inflammatory tissue. Five weeks later the patient again presented himself for examination. After leaving the hospital he had complained constantly of soreness, stiffness, and an increasing induration in and around his wound. Abdominal examination revealed a well-defined indurated mass, extending from the pubes upwards for about four inches. It was triangular in shape, the base being about four inches across and it tapered to a point just above the upper end of the incision. The patient was kept under observation until January 5, 1931. At that time the mass was quite localized, had grown a little and felt very definitely like bone. It then reached almost to the umbilicus.

February 11, 1931.—The patient again presented himself for examination. He complained of pain and

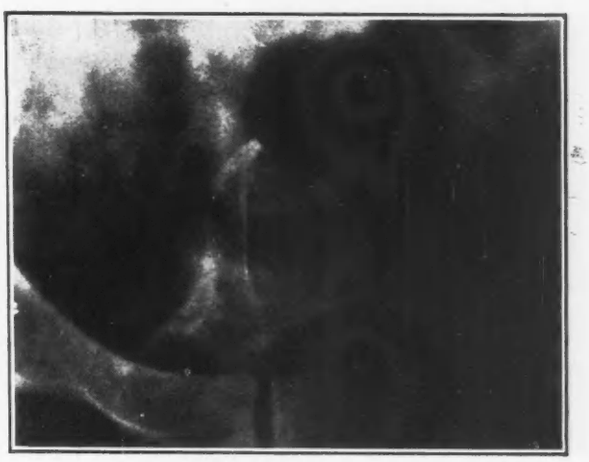

FIG. 1.—X-ray of pelvis seven months after prostatectomy, showing bone formation in abdominal wall. The bone formation is in the tissues surrounding the wound.

* A paper read before the North Central Branch of the American Urological Association, St. Paul, October, 1931.

stiffness of the lower abdominal wound when bending or sitting in a car. Following long drives he had a good deal of frequency and a burning sensation on urination. There was no difficulty in urination, however. On abdominal examination, no increase in the size of the mass was evident. It extended almost to the umbilicus and ended in a distinct knob which lay just below the skin and was quite protuberant. The whole mass seemed quite superficial. Pressure on the knob caused the whole mass to bend like a steel spring. On ceasing pressure it also recoiled, indicating that it was most certainly attached to the symphysis pubis. It was not particularly tender. Rectal examination was negative. The x-ray showed (Fig. 1) a triangular area of bone extending from the symphysis pubis by a broad base upwards to just below the umbilicus. It was apparently in the rectus muscle and was attached to the symphysis pubis.

Cystoscopic examination. — The cystoscope passed normally. The bladder capacity was normal; there was no unusual pain on distension, and definitely no bladder involvement. The diagnosis at the time was myositis ossificans involving the recti muscles. On April 14th, the patient complained that he found considerable uneasiness in the wound when driving a car and discussed the advisability of having it removed. The surgeon expressed his willingness to remove the mass if it was causing him great inconvenience but at the same time pointed out the possibility of recurrence following removal and suggested a consultation with another surgeon, to which the patient agreed. The consulting surgeon advised against operation and the patient expressed his desire to visit Rochester. He was referred to Dr. Hugh Cabot.

The patient was investigated at the Mayo Clinic during the latter part of April. They repeated the x-rays and also did a cystogram and concluded that the bladder was not involved. I am indebted to Dr. Cabot for his report.

Dr. Cabot[4] advised no surgical interference unless the mass was causing a good deal of trouble. He suggested that the formation might be due to the inclusion of a piece of bladder mucosa in the abdominal wall. He based his opinion upon the result of the work of Huggins[5] Since returning from the Mayo Clinic, the patient has remained quite well. Mentally he is satisfied. The bony mass is stationary in size and all bladder symptoms have subsided. A recent x-ray has been unobtainable owing to absence of the patient from the city.

COMMENTS

That true bone develops in most unusual places has long been recognized. Many observers have noted bone-formation in the kidney following ligation of the renal pedicle. These observers stressed the concept of metaplasia of connective tissue into bone through some unknown influence. Neuhoff[6] transplanted fascia into bladder defects. He found bone-formation strictly confined to the fascial transplant on the surface next to the urine. His opinion was that bone-formation could only be explained by a metaplasia of connective tissue, and that the genesis of this bone depended on the deposition of lime salts in the necrotic tissue of the fascial patch in contact with the urine.

It remained for Huggins to clarify this subject. He transplanted the ureters to the loin in dogs and showed that bone formed in fascial transplants in the bladder without the presence of urine. At this point he conceived the idea that the formation of bone must be brought about by the presence of some intrinsic element in the wall of the bladder acting on the connective tissue. He next carried out a series of experiments in which mucous membrane, muscle wall, and full thickness grafts were transplanted into the various layers of the abdominal wall. Invariably wherever he transplanted bladder mucous membrane he produced true bone formation. The transplants of muscle only never produced bone. Mucous membrane from the ureter or renal pelvis always produced bone. Mucous membrane from other portions of the body produced no bone. The process of bone formation

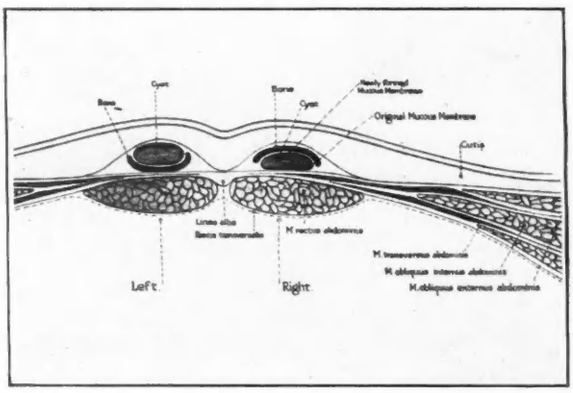

FIG. 2.—Diagram showing cyst formation with bone in relation to the newly formed epithelium.

was found to occur in a very characteristic manner. Seven to nine days following the transplantation of a piece of mucous membrane it was found that by a new growth of epithelium an epithelium-lined cyst was formed. The newly formed epithelium was not so tall as that of the original transplant. At sixteen days it was difficult to differentiate between the old and new epithelium. The connective tissue surrounding the new epithelium became œdematous and fibrillary in type. This tissue was more eosinophilic and contained more connective tissue than the tissue surrounding the other portions of the cyst. This was presumably a pre-osseous stage in the process.

About the twentieth day spicules of bone were seen adjacent to the newly formed mucosa. This bone was typically membrane bone with Haver-

sian systems and contained bone-marrow. The bone always developed in relation to the newly formed epithelium, as shown diagrammatically in Fig. 2.

Portions of the renal cortex, renal medulla, pelvic epithelium, and whole ureteral wall were also transplanted. The renal cortex and medullary grafts disappeared. The grafts of the renal pelvis and ureter formed cysts as in the case of the bladder mucosa. Portions of the adrenal and prostate were transplanted. The grafts lived, but no bone formed. Transplants of mucosa of the stomach, gall bladder, jejunum, and colon produced epithelial cysts but no bone. A circular area of all the layers of the bladder except the mucosa was excised but the mucosa was left intact. A piece of fascia was grafted into this. After 72 days only a scar remained, but no bone. Huggins concluded that this indicated the necessity of a proliferating epithelium in the production of bone.

He found that bone formed from bladder mucosal transplants, whether they were transplanted into fatty, muscle or fibrous layers. The results were best however when they were transplanted between fascial layers. Transplants of bladder mucosa into liver, kidney and spleen, only produced epithelium lined cysts, but no bone. In the lung abscess invariably followed. He concluded that there must be some chemical or physical difference in the connective tissue of these organs as compared with those found in the abdominal wall. The fibroblasts in morphological appearance were alike. He also found that if one completely denuded the fundus of the bladder of epithelium it became relined with epithelium in thirty-five to forty days, with no bone formation. He therefore concluded that the fibroblasts in the bladder wall did not ossify under the influence of bladder mucosa.

There are, therefore, two types of fibroblasts. In the first class—those that ossify—are the connective tissues of striated muscle, fascia, and fatty fibrous subcutaneous tissue. The second—non-ossifying—are the fibro-muscular wall of the bladder and connective-tissue stroma in the liver, spleen and kidney in the dog. Huggins also analyzed the fluid contained in these cysts and found that in most cases it contained a much higher percentage of calcium and phosphorus than the blood serum. Recently, while working in the Lister Institute in London, he has found an enzyme, "phosphatase," in and around the graft after the sixteenth day. Bone formation was shown by Huggins to occur very readily when the mucous membrane of the bladder of the dog is transplanted in the abdominal wall. Does this occur in the human being? Are there grounds for believing that it did occur in the case that we have reported?

With these questions in mind we set out to investigate the type of bony growth produced when the mucous membrane of the bladder or all its layers are transplanted into the abdominal wall. Up to the present time we have transplanted mucous membrane or the full thickness of the bladder wall into the layers of the abdominal wall in 26 dogs. We are reporting 18 only. In our first 6 animals we used small mucous membrane transplants. These were buried in the substance of the rectus muscle for 38, 43, 54, 79, 97, and 136 days respectively. In the 43 day specimen we found a small pearl-grey

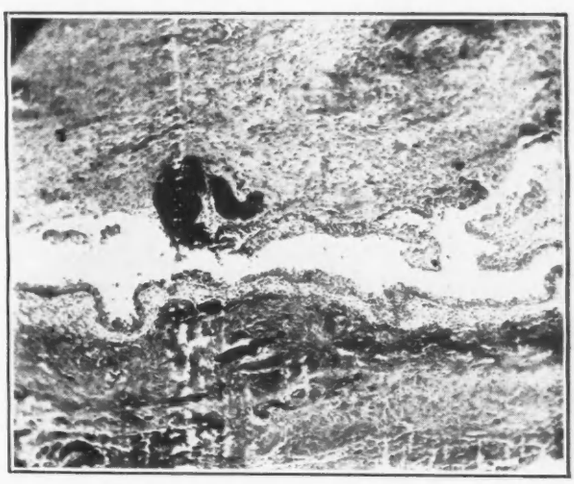

FIG. 3.—Cyst removed from Dog 33. There is a small area of bone present in relation to the newly formed epithelium.

cyst, soft in consistency but no bone was palpable. A micrograph however revealed a small portion of bone. In the 97-day specimen we again found a cyst but in this case definite bone was present on one side. A micrograph of a portion of the cyst wall is shown in Fig. 3. In the remaining 4 even the original graft could not be found.

Due to limited facilities, we used a combination of aseptic and antiseptic methods in our animal surgery. Our six original grafts when removed from the bladder were placed on cotton wool soaked in biniodide of mercury. We believed that in this way the graft might have been killed by the solution on the sponge. In six experimental animals we

transplanted mucous membrane only in the rectus sheath. In every case our transplants were carefully placed upon cotton wool that had been sterilized by boiling only. Moreover, we used larger transplants and sutured them in position by interrupted silk sutures. The transplants were left for 32, 44, 52, 54, 58, and 85 days respectively. In the 58-day specimen nothing was found. Cysts were developed in the remaining five. For some reason no bone was found in the 85-day specimen.

The growth and appearance of these cysts were quite characteristic. In the third week definite circumscribed soft fluctuating swellings could be palpated in the abdominal wall. They gradually became more prominent, harder, and in some cases appeared to be tender on pressure. They appeared to be approximately the size of the original graft. They moved freely under the skin and in some definite bone could be felt. These were the cases in which the original mucous membrane transplant faced ventrally. The newly formed mucous membrane and bone therefore formed close to the surface (Fig. 2). On opening up the belly wall, we were struck with the discreteness of the cyst. It was pearly grey in colour, intimately associated with the fascia of the rectus sheath, and was smaller than the original transplant. The grafts never extended to the mid-line incision through which they were inserted. There was never any extension into any of the surrounding tissues. When these cysts were removed from the abdominal wall they were found to have bone on one side only. The edges of the cysts were smooth. Fig. 5 is an actual photograph of one of these cysts.

In the third group of 6 animals, full thickness grafts of bladder were transplanted between the layers of the rectus sheath. These grafts were left 32, 44, 52, 54, 58, and 85 days respectively. In all but one case beautifully discrete cysts developed. These were identical with those already described.

Although the number of our experimental animals is small we believe that they are quite sufficient to compare with our clinical cases.

What we wish to decide is whether the recorded cases of bone formation in laparotomy wounds are of mucosal origin, especially the case reported in this paper. In this case the bladder was opened and a portion of the mucosa could possibly have been transplanted accidentally.

The case recorded by Silver occurred in the upper abdomen following a cholecystectomy. The growth was removed without recurrence. We can see no possibility of any mucosa having been transplanted in this case. Our case, although occurring in the lower abdomen, is very similar. A large sheet of bone undoubtedly is attached to the symphysis pubis. It extends

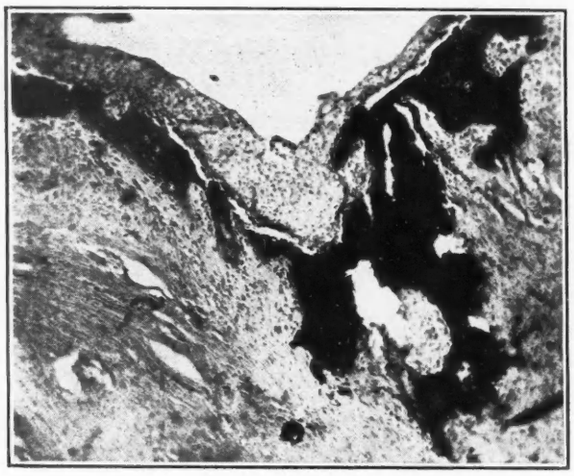

FIG. 4.—Portion of wall of cyst removed from Dog 38. Note the well defined bone formation throughout the length of the section. This cyst was removed 97 days following transplantation. During this time the dog had nine pups and was nursing them.

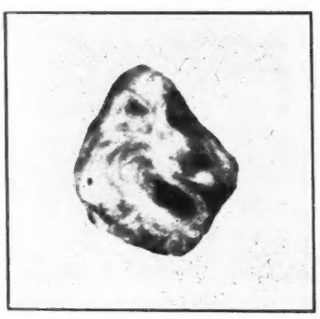

FIG. 5.—Cyst removed from abdominal wall.

far beyond the original incision, in our case, on all sides. It is as if the muscle wall surrounding the wound had been infiltrated in all directions with bone. Does this in any way resemble the small discrete definitely circumscribed cysts produced experimentally? In all Huggins' work, cyst formation with bone limited absolutely to the newly formed epithelium occurred. In no case did he find the new bone extending into the surrounding tissue. There was no cystic formation in Silver's case, and we believe that there was none in the case that we are reporting. Even in Kretchmer's case, where the two small pieces of bone were buried in the fistulous tract

leading to the bladder there is in our minds a great doubt that they were of mucosal origin.

Conclusions

1. Bone-formation in abdominal scars is a very rare occurrence.

2. Following the transplantation of the mucous membrane of a dog's bladder into the connective tissues of striated muscle, fascia, and fatty fibrous connective tissue, an epithelium-lined cyst is formed.

3. On about the 20th day bone makes its appearance next to the newly formed epithelium, and reaches its highest point of development in about 60 days.

4. The newly formed bone is strictly limited to the newly formed epithelium and never infiltrates the surrounding tissues.

5. This in no way resembles the bony growths that occur in abdominal scars and heretofore have been classified as myositis ossificans. These are not cystic and are frequently of large size.

6. At the present time there is no evidence that mucous membrane of the human bladder when transplanted into the abdominal wall will produce bone.

This investigation is being carried out on a Fellowship from the Banting Research Foundation, whose aid we acknowledge with thanks. All surgical work has been done in the Department of Physiology, University of Manitoba. We wish to acknowledge our thanks to Dr. V. H. K. Moorhouse, Professor of Physiology, and all the members of his staff, for their interest and co-operation.

The gross and histological study of all material has been carried out by Dr. Sara Meltzer in the Department of Pathology, University of Manitoba, to whom we are also greatly indebted. We wish to thank Dr. Boyd, Professor of Pathology for his interest in our investigation.

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LIVER EXTRACT IN THE TREATMENT OF PERNICIOUS ANÆMIA

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During the past few years the use of liver or stomach tissues, or extracts of these, has assumed great importance in the treatment of patients suffering from pernicious anæmia. Varying reports are encountered in the literature in which the potency of liver extracts is discussed. In this paper the results obtained when extracts prepared in the Connaught Laboratories were employed in a series of 43 persons suffering from pernicious anæmia are presented.

The Method of Preparation of Liver Extract

The extract produced by this laboratory has been made by a standard method since April, 1928. The procedure employed is a modification of that developed by the Harvard group,* and is as follows. Fresh beef liver is minced and extracted with water adjusted with sulphuric acid to secure pH 5.0. The mixture is heated to 60°C., to coagulate the albumin, and filtered. The filtrate is concentrated in a vacuum still at low temperature. The concentrate is poured into sufficient alcohol to give a concentration of 55 per cent alcohol. A precipitate, shown by tests to be inactive, is removed by filtration. Sufficient alcohol is then added to the filtrate to give a concentration of 95 per cent. The precipitate thus produced is dried in a vacuum oven and pulverized. There would seem to be little chance of such an extract changing in potency from batch to batch, unless there is some seasonal or other variation in the individual livers. There is at present no evidence of any such change, and with the large number of livers used in each batch there would seem to be little likelihood of any such individual variation being great enough to affect the potency. Every effort has been made to standardize the procedures used in the preparation of this material and to prepare for distribution a homogeneous mixture of numerous individual lots. There is, therefore, from this

*The information that a potent extract could be prepared by this simplification of their procedure was communicated to the Harvard group in July, 1927.

viewpoint, no reason to suspect any change in potency between the various lots of extract.

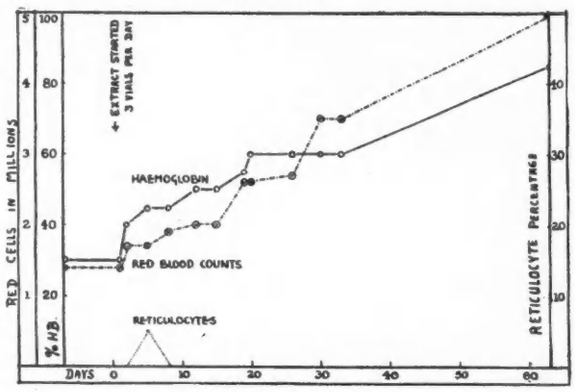
THE METHOD OF TESTING LIVER EXTRACT

During the year 1927 liver extract was prepared in these laboratories and distributed gratuitously. Since that time sufficient material for one month's treatment has been made available without charge to physicians who have suitable patients under their care and who are willing to cooperate in the testing. In cases where it is not convenient for the physician to make reticulocyte counts, slides stained with cresyl-blue are provided. Blood smears made on these slides by the physician before and every second day for two weeks after treatment commences are returned to the laboratory, where the reticulocytes are counted. Hæmoglobin determinations and red cell counts are made before and at regular intervals after treatment is started. In spite of numerous attempts to develop other procedures, the clinical test is the only reliable method at present available for determining the potency of the extract.

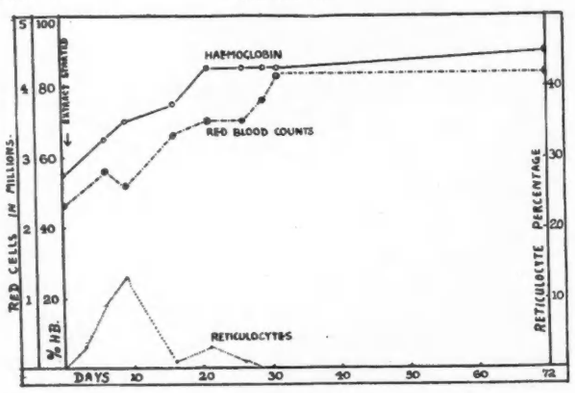
THE CLINICAL RESULTS

Evidence of the constant potency of this extract is available from the results obtained in this group of 43 patients on whom were tested various lots. These patients were unselected. However, they were known not to have received liver in any form for at least the month preceding the test. They represent the entire group of cases of which we have records of red-cell counts, hæmoglobin and reticulocyte determinations, used to test the extracts prepared as outlined above. The records of these patients were made available by the courtesy of their attending physicians. The patients varied in age, duration and severity of symptoms, complications, and to a moderate degree in the amount of liver extract ingested. The initial dose usually recommended was the contents of three vials per day (*i.e.*, the extract from 675 grams of liver), and no further therapeutic measures other than the use of hydrochloric acid in some cases were adopted. The number of days these patients were under treatment with this extract varied, but for the entire group it averaged 44 days per patient. As would be expected, and as is recommended, the majority of these patients, once their allotment of free extract was consumed and partial recovery had been established, changed over to a liver diet. Consequently, reports of individuals using liver extract in adequate doses over long periods of time are scarce. A Table giving the results in all these cases, and charts showing the characteristic response to a potent extract for six of the cases are presented. In many cases the peak of the reticulocyte rise was probably missed, but it was not possible to obtain blood smears at more frequent intervals. There is a wide range of individual variation in the degree of response obtained with any one extract. A good response (*i.e.*, high reticulocyte and hæmoglobin percentage and red-cell count) may occur in a patient who is receiving a small dose of extract, while a second patient taking twice as much of the same extract responds to only a

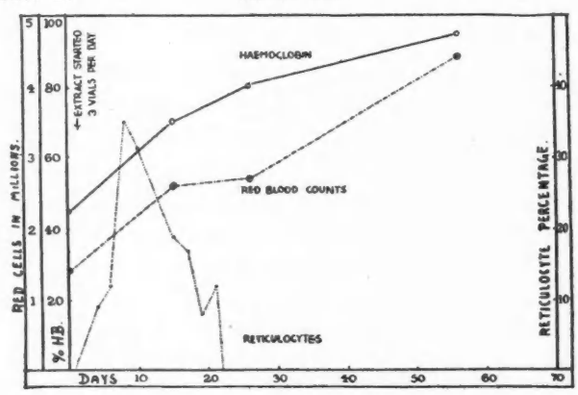
Case 7 CHART I



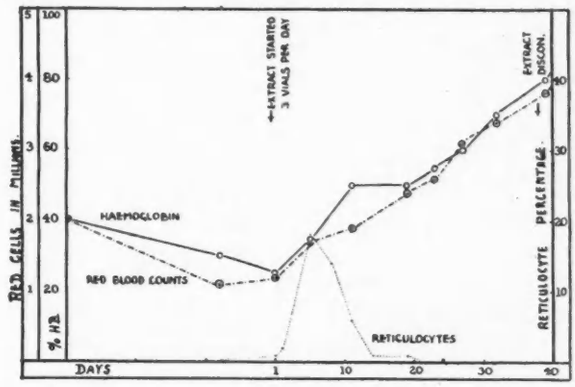
Case 9 CHART II



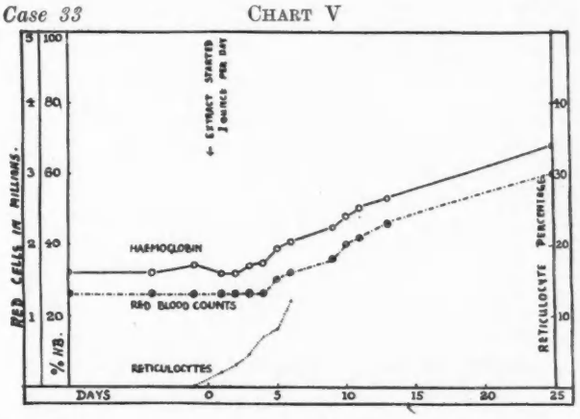
Case 13 CHART III



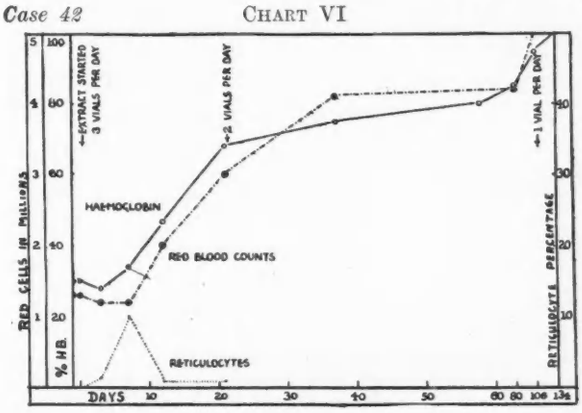
Case 29 CHART IV



Case 33 CHART V



Case 42 CHART VI



TABLE

Case No.	Before Use of Extract R.B.C.	Before Use of Extract Hbg.	Days on Extract	After Use of Extract R.B.C.	After Use of Extract Hbg.
1	4.62	85	138	5.20	90
2	3.13	65	105	5.56	88
3	2.05	54	92	4.23	83
4	1.20	30	92	4.60	90
5	2.15	55	88	3.99	80
6	1.10	40	84	4.45	90
7	1.42	30	75	5.00	85
8	3.10	84	70	5.41	100
9	2.30	55	70	4.16	90
10	1.10	60	70	5.80	62
11	4.86	98	65	5.16	98
12	1.70	52	60	2.40	58
13	1.45	45	57	4.45	95
14	3.23	82	55	5.44	100
15	3.36	75	55	4.60	90
16	0.85	30	47	3.51	76
17	2.10	40	46	3.30	80
18	1.59	40	43	5.62	60
19	0.19	10	42	4.00	50
20	2.57	60	41	3.91	81
21	1.00	35	41	2.80	42
22	1.80	28	39	2.40	54
23	4.16	90	38	5.94	98
24	1.60	45	35	3.70	50
25	0.80	36	35	3.55	58
26	1.07	35	30	3.02	68
27	1.16	35	30	3.25	70
28	2.61	60	30	3.00	70
29	2.08	40	28	3.80	80
30	2.57	60	28	3.99	80
31	1.90	35	27	3.75	90
32	0.87	35	23	3.20	70
33	1.28	32	23	3.00	68
34	2.50	55	23	3.10	65
35	0.98	20	19	1.73	40
36	1.26	22	18	2.00	28
37	4.75	85	18	5.61	90
38	1.5	45	18	3.25	64
39	1.17	30	17	2.18	47
40	2.39	55	16	2.84	65
41	2.70	50	16	3.20	67
42	1.30	30	21	3.00	67
43	3.10	62	9	3.90	72

The figures under R.B.C. represent the red cell count in millions per cubic millimetre.
Hbg. represents the percentage of normal hæmoglobin.

slight degree. Of these 43 cases all but one may be said to have shown satisfactory improvement. This case (No. 10) had a satisfactory rise in red cell count, but an unsatisfactory rise in the hæmoglobin percentage. With this exception however, every case amongst those treated since April, 1928, of which we have records, has shown the extract to be potent. An examination of the figures in Table shows that the average daily increase in hæmoglobin was about 0.6 per cent. The average daily increase for those treated not longer than 44 days was 0.9 per cent. The average increase per person for the whole group was 24 per cent, whilst that for the group treated not longer than 44 days was 21 per cent. On the other hand it can be calculated that if the group which was treated not longer than 44 days had maintained their average daily increase for a total of 44 days each, the increase would have been approximately 40 per cent.

A critical study of the data presented in the Table makes evident certain discrepancies in the results. In several cases the colour-index is not typical of pernicious anæmia, and in some patients the hæmoglobin and red cell responses were not in concordance. This may be due to inaccuracies in the measurements resulting in part from the fact that the determinations were made by a number of observers.

These errors might be partially overcome by making the determinations in one laboratory, but such an arrangement is difficult under the present circumstances. As yet there is no other course open to this laboratory than the one outlined above for the assay of liver extract.

SUMMARY

1. The technique of the preparation of Connaught Laboratories' liver extract is carefully standardized.

2. Each lot of such extract submitted during the past three and one-half years to the clinical test, in the manner outlined above, has been potent.

3. Evidence is accumulating that there is a very wide variation in patients with regard to the degree of response to a given extract.

4. A summary of the results obtained in 43 cases of pernicious anæmia treated with the liver extract for varying periods of time is presented.

The helpful interest of Dr. J. G. FitzGerald, Director of the Connaught Laboratories, is very much appreciated. Our colleagues, Drs. D. A. Scott and M. H. Brown, have assisted us very greatly in this investigation. The studies, the results of which are presented here, have been made possible by the cooperation of a group of physicians whose assistance is gratefully acknowledged.

HYPOTHALAMIC MECHANISMS*

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EXPERIMENTAL data concerning the rôle of the hypothalamus in "visceral" functions have accumulated rapidly within the past twenty years, but it is unfortunate that little attempt has been made to state the results in terms of structural units and thus obtain a picture of the mechanisms involved. One cannot blame experimentalists for such an omission, but rather those who have made studies of the morphology of the region. The cell groups have been charted and described in differing nomenclatures, with inevitable confusion. A nuclear mosaic constructed in such a way suggests no mechanisms until the connections of the fibre tracts supply the key to the underlying design.

As a continuation of the work published by Beattie, Brow and Long[2, 3] on the histological studies of the effects of small lesions in the posterior hypothalamus, a systematic study of the degenerations following small lesions in other regions of the area has been undertaken in this laboratory during the past two years. The results of this work have been to establish the efferent connections of the various cell groups with some degree of accuracy. The principal afferent connections have been traced and in this way the fundamental neural pattern of the region has become more comprehensible. Fortunately, it has been possible to check these results against the data supplied by Rioch[26, 27, 28] in his studies on the carnivore diencephalon. Working with Weigert material, he admitted that he had no means of checking the direction of the nerve tracts or of charting accurately the non-medullated connections. In spite of these limitations, his description remains by far the most complete and accurate study of the whole hypothalamus. It is not necessary to review here the published anatomical data, as that has been done in detail by Rioch.

When the results of the investigations in this laboratory were correlated, it was found that the hypothalamus was made up of three areas or groups of nuclei. Each had its own characteristic efferent fibre pattern. Variations of the cell groups within each area were observed, but the efferent fibre pattern remained remarkably constant. Consequently, it is now possible to describe the anatomical mechanisms within the hypothalamus and to attempt a correlation between these mechanisms and the physiological data.

The three areas or cell groups mentioned above may be called the supra-optic, tuber cinereum, and the posterior or supra-mamillary groups. The supra-optic or anterior group lies around the dorsal and posterior region of the optic chiasma and is anterior to the infundibular recess, while in front lies the anterior commis-

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sure. The tuber nuclei surround the infundibular recess, being embedded in its wall and extending upwards into the lateral wall of the third ventricle for a variable distance. The posterior group occupies the lateral wall of the third ventricle posterior to the middle commissure of the thalamus, and extends downwards to the supra-mamillary region.

The supra-optic group of nuclei establishes at least four distinct efferent connections:— (a) to the pars posterior and pars intermedia of the pituitary; (b) to the nuclei of the tuber, especially to the nucleus hypothalamicus ventro-medialis of Rioch; (c) to the periventricular gray matter, in which they run to the posterior hypothalamic nuclei; (d) to the tegmentum, where they link up with fibre tracts which carry impulses down into the region of the dorsal reticular formation of the medulla. None of the

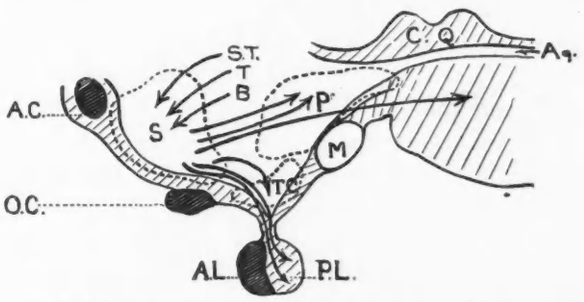

FIG. 1.—A diagram to show the situation of the various nuclear masses of the hypothalamus and the connections of the supra-optic group of nuclei, superimposed on the lateral wall of the third ventricle. A.C., anterior commissure; A.L., anterior lobe of the pituitary body; Aq., aqueduct of Sylvius; B., fibres from the medial forebrain bundle; C.Q., corpora quadrigemina; M., corpora mammillaria; O.C., optic chiasma; P., posterior group of nuclei; P.L., posterior lobe of the pituitary body; S., supra-optic group of nuclei; S.T., fibres from the stria terminalis; T., fibres from the thalamus; T.C., tuber nuclei.

efferent fibre systems seem to cross the middle line.

The afferent connections are complex, but seem to be divisible into at least two components:— (a) those from olfactory areas through the stria terminalis and the medial fore-brain bundle; (b) those from the thalamus. The thalamic fibres are derived from the medial nuclei and the nucleus reuniens. Greving[13] considered that the supra-optic nuclei could be controlled by direct cortical fibres from the frontal area. It seems more likely however that cortical control of these nuclei is exerted mainly, if not entirely, through the thalamus.

The nuclei of the tuber region are very closely inter-connected by non-medullated and medullated fibres. Their efferent tracts are arranged in four systems:— (a) to the posterior lobe of the pituitary from the nucleus ventro-medialis. These fibres may be a relay pathway from the supra-optic group to the pituitary; (b) from the nuclei into the periventricular gray matter, ending around the posterior hypothalamic cells; (c) fibres which pass through the posterior hypothalamic area and end in small cells of the gray matter of the aqueduct; (d) fibres, both crossed and direct, which become associated with Field H_1 of Forel and end in the tegmentum. This system is the same as the fasciculus tuberis descendens of Nicholesco and Nicholesco.[22] The commissural fibres enter Ganser's commissure and pass backwards into the same fasciculus. The further communications of these projection tracts are still obscure. Langworthy and

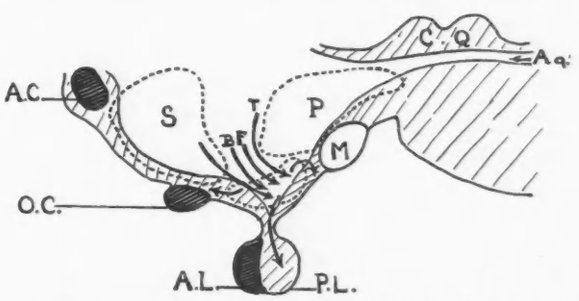

FIG. 2.—A diagram to show the connections of the tuber nuclei. The arrows ending in the hatched surface indicate the position of the decussating fibres from these nuclei. F., fibres from the fornix bundles; remainder of lettering as in Fig. 1.

Richter's experiments[20] lead one to believe that they become more laterally placed in the tegmentum and may pass into the cord in the posterior and lateral columns. Beattie's[4] work on the relation of the tuber nuclei to gastric and cardiac functions would seem to demonstrate an association of the projection tracts with the visceral motor nuclei of the vagus. His observations on bladder motility require projection tracts into the sacral cord. There is little doubt that these projection tracts are made up mainly of short neuronal relays.

The afferent pathways to these nuclei are derived from the thalamus and from the olfactory tracts and nuclei, through the fornix and medial fore-brain bundle. The thalamic fibres seem to be not only afferent but also efferent and are derived mainly from the medial thalamic nuclei.

In the posterior hypothalamic region the ef-

ferent pathways are relatively simple. The fibres, direct and crossed, are both medullated and non-medullated and are distributed to the tegmentum and the posterior longitudinal bundle, in which they descend into the spinal cord. Beattie, Brow and Long,[2, 3] showed that there were at least two areas in the brain stem where they were distributed extensively, the mid-brain and the reticular formation in the mid-medulla. The fibre pathways in the spinal cord are very small in number and it seems likely that the main connections are made by short neuronal relays. The fibres from the posterior nuclei are both direct and crossed. The place of crossing of the latter is in the supra-mammillary decussation.

The afferent fibres are derived from the medial fore-brain bundle and from most of the medial thalamic nuclei with some contribution from the ventral nuclei in addition. Afferent neurons from the supra-optic and the tuberal

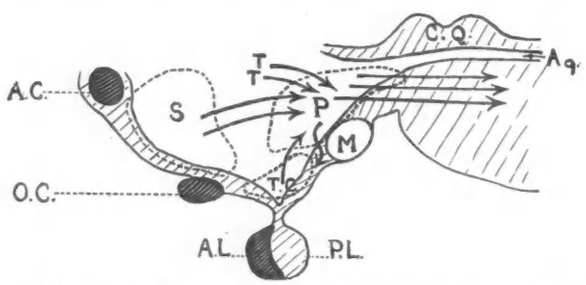

FIG. 3.—A diagram to show the connections of the posterior hypothalamic nuclei. Lettering as in Fig. 1.

nuclei have been pointed out before. One gets the impression that, as in the case of the tuberal group, there are afferent and efferent fibres linking the posterior group of nuclei with the thalamus.

Popa and Fielding[24] have shown that there is a "portal" circulation connecting the hypophysis and certain areas of the hypothalamus. They claim that the venous blood from the pituitary is drained partly into the cavernous sinus and partly into small channels in the stalk. These vessels pass up into the tuber region and break up in and around the tuber nuclei. In this way they consider that blood containing hormones from the pituitary can be brought into relationship with hypothalamic nuclei. While it is possible that the vessels they describe may be blood-containing channels, I have not been able to satisfy myself that fine particles can be forced into these channels from the internal carotid artery in the cat. However, fluid containing iron salts can be injected into the posterior lobe of the pituitary and precipitated in these vessels and around the cells of the tuber nuclei as prussian blue.

The anatomical facts suggest two distinct mechanisms which are interlocked by communicating fibres but have separate effector pathways and independent linkages with the thalamus. Each mechanism or complex may be excited independently, but it would appear from the anatomical evidence that the posterior hypothalamus is under some control by the anterior hypothalamus. Because of this interrelationship release phenomena must be expected when one or other part of the hypothalamus is destroyed.

The "supra-optic-posterior pituitary-tuber cinereum" complex we may conveniently label the anterior mechanism. It is clear that the tuber, from which the main efferent fibres of this mechanism take origin, can be excited by direct thalamic fibres and independently of the supra-optic nuclear mass which controls the posterior lobe of the pituitary. If one accepts the evidence of Popa and Fielding[24] on the channels from the pituitary to the tuber and admits Cushing's[9] interpretations of his experiments on intra-ventricular injections of posterior pituitary extract, this anterior mechanism seems to be a device for the production of "parasympathetic" phenomena. Fulton and Ingraham,[12] by sections passing into the supra-chiasmatic region of the cat, appear to have severed the connections of the supra-optic nuclei with the tuber and the posterior hypothalamus. Their experiments may be interpreted as a release of the posterior hypothalamus from the control of the anterior mechanism. They suggested the possibility of the removal of cortical control of the hypothalamus, but the former interpretation seems to be more feasible. Bard[1] in his experiments has demonstrated that "sham-rage phenomena" depend upon the integrity of the posterior hypothalamus. It is clear however that the cortex does modify thalamic and hypothalamic responses, acting probably mainly as an inhibitor of the posterior hypothalamus. Beattie, Brow and Long[3] showed that when the posterior hypothalamus was destroyed or its efferent tracts severed the animals became drowsy and their temperature fell. They lost the power of pilo-erection and the pupils con-

tracted down to a slit for some days. In acute experiments the heart rate slowed markedly and the A-V conduction time was increased. These effects seem to be due to a release of the anterior mechanism.

When the tuber nuclei or the posterior lobe of the pituitary gland is destroyed, no release phenomena of the posterior hypothalamus are observed, for the latter region still retains its supra-optic connections, and is thus held in check. If, however, the tuber nuclei are stimulated without any spread of current, Beattie[4] has observed increased motility of the stomach and bladder with some increase in gastric secretion. The heart rate was slowed and the A-V conduction time was increased from 0.06 to 0.08 second. When the conduction time was already 0.08 second, tuber stimulation caused no change. Section of both vagi abolished these effects on the stomach and heart.

Cushing,[9] in a series of experiments on the non-anæsthetized human subject, injected posterior lobe extract into the ventricular system of the brain. After a latent period of 4 to 5 minutes, he observed flushing of the skin, sweating, initial fall in blood pressure, fall in temperature, signs of increased gastric and intestinal activity, with vomiting in some cases and bowel evacuation. Atropine abolishes these effects, as does avertin anæsthesia. Keese and Keese[19] have shown that the barbiturate group of anæsthetics have an affinity for the thalamic and hypothalamic nuclei, consequently depressing the nerve cells of these areas and abolishing or diminishing reflex activity or stimulation effects involving such regions. It has been shown that avertin acts on the same areas leaving the cortex easily excitable.

Chahovitch[7] noted that after bilateral vagotomy the basal and general metabolic rates were increased. Cushing observed in one of his pituitary injection experiments that the basal rate dropped from -13 to -31. In patients who showed marked shivering with the temperature fall, the basal rate was elevated in one case to +46.

Rabb[25] considered that the posterior pituitary and tuber nuclei are concerned in the metabolism of fats in the liver. When the efferent paths from the tuber are destroyed or the pituitary destroyed, there is an increased deposition of fat in the body.

The relation of the tuber-pituitary mechanism to carbohydrate metabolism is by no means settled. It has been known that small lesions of this region produce glycosuria and hyperglycæmia. Houssay and Biasotti[14] reported that removal of the pituitary diminishes the glycosuria of depancreatized animals and allows of survival without insulin for periods up to six months. When the tuber is destroyed in depancreatized animals there is no change in the glycosuria. The same observers have noted that similar changes take place in phloridzinised animals.[15] Clinical observations by Cushing[10] indicate that the glycosurias of acromegaly disappear when the posterior lobe is thrown out of action by the pressure of an enlarging tumour. Burn[5] has shown that the "vasopressin" constituent of the posterior lobe secretion inhibits the action of insulin. Clark,[8] however, suggested that the right vagus has a tonic inhibitor action on the islet tissue of the pancreas, as immediately after section there is a fall in blood sugar followed later by increased glucose tolerance. These observations lead one to believe that the secretion of the posterior lobe is related to carbohydrate metabolism partly by a hormone thrown into the general circulation, while the activation of a nervous mechanism whose effector pathway is the vagus, controls insulin secretion. This does not negative the control of the posterior lobe secretion by nervous pathways.

In general the experimental evidence seems to point towards an acceptance of the anterior hypothalamic complex as a "parasympathetic centre", as postulated by Cushing. It would appear also that the work quoted above suggests that carbohydrate metabolism control from this region is effected partly by the peripheral action of a posterior lobe hormone, probably vasopressin, and partly by a nervous mechanism whose effector path is the right vagus. The efferent pathways of this complex seem to link up with the cranial and sacral autonomic centres probably by short neuronal relays, the final pathways being the vagus and the pelvic nerves.

The second mechanism, or posterior hypothalamic complex, is much more easily understood. The evidence from many sources, which was summarized by Beattie, Brow and Long,[3] when taken in conjunction with their own ob-

servations, indicates that this mechanism exerts a control over the thoraco-lumbar sympathetic system and the secretion of adrenaline. Many other observers have demonstrated reflex centres in the brain stem and cord for adrenaline secretion and other sympathetic phenomena. Beattie, Brow and Long's work shows that these centres are connected by nervous pathways with the posterior hypothalamus.

Release phenomena due to the removal of the anterior hypothalamic mechanism have been noted by Morgan,[21] although this is not the interpretation which he gives in his published accounts. It has been pointed out already that Bard's experiments[1] on "sham-rage" and Fulton and Ingraham's[12] on supra-optic lesions are best interpreted in the same way.

Stimulation of the posterior hypothalamus gives rise to pressor, cardiac-accelerator, pupillo-dilator and pilomotor effects. Karplus and Kreidl[16, 17, 18] observed first the influence of this region on the lachrymal, salivary and sweat glands, vaso-constriction and adrenaline secretion, although they considered the area involved was the medial part of the corpus subthalamicum.

Controlling influences acting on this mechanism are exerted by the cortex and the thalamus and by the supra-optic nuclei. Cortical control is mainly in the direction of inhibition of the area while the thalamic control is definitely excitor. Bard's experiments demonstrate the hyperexcitability of the region when the cortex is removed.

There are probably other mechanisms involved in the hypothalamo-pituitary complex, but while suggestive evidence has appeared, much remains to be done. Fee and Parkes[11] showed that the anterior pituitary must be intact for ovulation to take place, but as anæsthesia of the vagina and external genitalia does not interfere with ovulation in an intact animal, it is difficult to visualize a neuronal pathway which would activate the anterior pituitary and so cause ovulation. I have omitted any reference to heat-regulation, as an interesting study of this mechanism is about to be published by Kellar. The problem of diabetes insipidus is by no means clear. Cushing[10] has summarized the evidence and concluded that, while both the supra-optic nuclei and the posterior pituitary with its infundibular stalk are undoubtedly concerned in this condition, the balance of evidence at the moment suggests "irritation" rather than "paralysis" of some neural or neuro-hormonal complex. Until more precise information on the histological effects of lesions of the supra-optic and tuber nuclei have been published, with accurate observations of the water metabolism, it is idle to speculate on the mechanisms involved in polyuria.

There is no direct evidence of the functional activity of the hypothalamus in the intact animal. Evidence which suggests a tonic activity may be found in Beattie, Brow and Long's observations[3] on animals surviving bilateral lesions of the posterior hypothalamus, in Morgan's experiments,[21] in Clark's[8] and Chahovitch's[7] experiments on the effects of vagal section. The hypopyrexia in Beattie, Brow and Long's experiments finds its counterpart in the hyperpyrexia recorded by Morgan. The lethargy displayed by the animals described by the former observers is in marked contrast to the hyperirritability of Bard's animals. These various effects which have been interpreted above as "release" phenomena of one or other mechanism, suggest but do not prove tonic activity.

There is ample evidence that one or other mechanism gives rise to "mass reactions". It seems unlikely that either the anterior or posterior complexes may produce a specific activity of one part of the autonomic system, *e.g.*, pupillo-dilatation without other sympathetic effects or gastric activity without other parasympathetic phenomena. At present the evidence seems to be against a series of discrete "centres" and more in favour of a generalized activity of one or other complex. It may be that in the hypothalamus are to be found the effector mechanisms which bring about the condition of "homeostasis" (Cannon[6]), or stable internal environment.

The hypothesis of hypothalamic function which has been suggested above seems to fit the present data. Henri Poincaré[23] in a discussion of scientific hypothesis wrote: "If it does not stand the test, it ought to be abandoned without reserve. . . . if the test does not support it, it is because there is something unexpected and extraordinary and because there is going to be found something that is unknown and

new.'' No better fate is wished for these suggestions. No better fate do they deserve.

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CORONARY THROMBOSIS*

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THROMBOSIS is coming to play an increasingly important part in medicine. It is four times as common in some European countries in recent years as it formerly was. For example, in some German hospitals thrombosis is found at autopsy in one case in every four, and embolism in one case in every twenty. Its increasing frequency some attribute to the increasing prevalence of intravenous therapy.

Thrombosis is the agglutination of a mass of platelets glued together with fibrin, occasionally including layers of leukocytes. It is entirely different from clotting. Thrombosis can only go on with a flowing stream carrying a sufficient number of platelets to build up the white mass. On the other hand, clotting can only go on when the stream has ceased to flow, usually after the lumen of the vessel has been completely occluded by thrombosis or embolism.

The three important causes of thrombosis are damaged intimal cells, slowing and eddying of the stream, and an increased number or agglutinability of platelets. The two latter causes might be sufficient to produce thrombosis in a vein or in one of the auricles, but in the ventricle or in a peripheral artery the flow is so swift that to cause thrombosis the intimal cells must be damaged, dead or absent. Therefore, in coronary thrombosis, there must always be an antecedent vascular disease, which, according to Klotz, is a primary, intimal sclerosis. Thus, while the diagnosis of coronary sclerosis is merely a probability in angina pectoris, in coronary thrombosis it is a certainty. In fact, coronary sclerosis in itself is a sufficient cause for thrombosis, apart from slowing of the stream or increased number of platelets, which latter two causes operate chiefly in veins and auricles. If they do act in producing coronary thrombosis it is only as contributory or secondary causes.

MEDICAL PATHOLOGY

The symptoms, diagnosis and treatment of coronary thrombosis must be based on an understanding of its medical pathology. When a branch of one of the coronaries is occluded the symptoms are partly dependent on the suddenness and completeness of the obstruction, but chiefly on the size of the vessel and the area supplied. If the vessel be sufficiently large sudden death may result before pathological change has time to occur in the area of muscle supplied. Thus, at autopsy, the thrombosis might be missed because the branch affected might be too small to be opened by an ordinary pair of pointed scissors. When death does not result, the anæmic area of muscle softens and becomes necrotic. This process is called infarction, and the area of muscle involved is an infarct. If the infarcted area includes the whole thickness of the ventricular wall, rupture with sudden death may occur within two to two and one-half weeks. It is thus more dangerous to move a patient in the second week, when time has elapsed for softening of the heart muscle, than it is during the first few days of the attack, unless he be in a state of collapse. By three weeks the danger of rupture is virtually over, except in progressive cases. If

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the infarct involves the outer part of the heart a fibrinous exudate forms on the pericardial surface, which may produce a friction. This sign has great diagnostic value, but unfortunately is present in only fifteen per cent of cases. When the infarct involves the inner surface of the ventricle, as it most frequently does, platelets may agglutinate on the damaged endocardium and form a thrombus within the cavity of the ventricle. This separates in fifteen per cent of cases, causing embolism either in the peripheral arteries or, more rarely, in the lungs, if from the right ventricle. As this thrombus is large, it frequently lodges at the bifurcation of the aorta and breaks, plugging both femoral arteries.

Five times out of six, or oftener, the patient is a man. In fifty or sixty per cent of cases careful inquiry will show that previously the patient has had angina or decreasing exercise tolerance or increasing dyspnœa on exertion. Different authorities state that from thirty-five to sixty per cent of the cases have had hypertension. Ten per cent have been diabetics. Very few of them have been syphilitics. It has been known to occur as early as fourteen years of age but the majority of patients are between forty and sixty. The curve of incidence starts at thirty and rises steadily and rapidly to fifty-five or fifty-six. From here on the incidence declines just as steadily and rapidly as it rose.

The symptoms, at the onset, have every possible variation and severity from those that result in instant death to those that are absent or so slight that the patient disregards them and continues working without consulting a physician. The most severe clinical group, and the smallest includes those patients who drop dead anywhere, independently of exertion, or collapse on the street, become unconscious, and die in a few minutes. Others get terrible distress, either across the chest or at the lower end of the sternum or in the epigastrium, vomit a few times, and die in a few minutes or a few hours. These cases used to be called "acute indigestion". Some are wrongly diagnosed as cerebral hæmorrhage. It should be remembered in this connection that cerebral hæmorrhage does not produce instant death. Very few such patients die inside of twenty-four hours.

The largest group in which the diagnosis of coronary thrombosis is made include those with a sudden, severe, persistent pain in the chest, accompanied by shock, vomiting, collapse, anxiety, pallor or cyanosis, small rapid pulse, or disappearance of the pulse at the wrist, and, possibly, unconsciousness. These cases are frequently followed by signs of circulatory failure, such as œdema of the lungs or legs, or a rapid enlargement of the liver. Frequently the attack is ushered in by a series of milder pains for a period of a few days previously, coming either at rest or on exertion. This group, with the so-called characteristic onset, led Christian to remark that the diagnosis of coronary thrombosis was easy.

On the other hand, there is a third group, the largest of all, which consists of mild cases in which the diagnosis is frequently overlooked, and is at least difficult or doubtful. Some cases begin with slight pain in attacks of short or long duration or with no pain at all. There may be only a sudden unaccountable faintness or dizziness with or without nausea, vomiting or discomfort in the chest. The diagnosis of coronary thrombosis should be suspected and the patient put to bed for further investigation, whenever any of the following changes, referable to the heart, produce a sudden alteration in the patient's condition—the rapid appearance of signs of circulatory failure; a sudden increase in signs of failure; a sudden decrease in the exercise tolerance (due to dyspnœa or palpitation or pain); the initial onset of angina pectoris or a new rhythm such as auricular fibrillation; block or paroxysmal tachycardia; and also the initial onset of cardiac asthma, or acute œdema of the lungs in an arteriosclerotic person. The diagnosis of coronary thrombosis should also be suspected when a patient with angina gets an attack of a different sort of pain lasting half an hour or more, especially if it comes when at rest, or if there is a sudden increase in the frequency of the attacks or the ease with which they are produced. The diagnosis should also be suspected when an individual over thirty or forty gets an initial unaccountable pain in the chest, lasting half an hour or more. In this third large group there is frequently no alteration in the heart or circulation on physical examination.

DIAGNOSIS

In the diagnosis of this disease, there are seven points.

1. *Previous history.*—Half or more of the cases have a previous history of angina, increasing dyspnœa or palpitation on exertion.

2. *Nature of the attack.*—The important point about the pain is its persistence. It may last

from half an hour to a few days. It may return at intervals for two or three weeks.

3. *Leukocytosis.*—Almost immediately after the pain starts there is a leukocytosis, with a high percentage of polymorphnuclears. The total count may be valueless unless a differential estimation be done. Thus a count of 9,600, with 85 per cent of polymorphnuclears is weighty confirming evidence, while a count of 9,600 without the differential is valueless. The total count is usually from twelve to sixteen thousand; it fairly frequently reaches twenty thousand and in one case was forty thousand. Libman says this sign is practically never absent.

4. *Fever.*—Starting after thirty-six hours, usually there is a slight fever lasting from one to ten days. In mild cases it may be only 99.2° for a day or two, or it may reach 101° or 102°, and it has lasted as long as six weeks. On the day of the pain a leukocytosis of fifteen or twenty thousand with a normal temperature presents a striking pathognomonic combination. Only in very mild cases, and then very rarely, is fever absent.

5. *Changes in the heart or circulation.*—These may be tabulated as follows:—increased pulse rate, weak thready pulse, disappearance of the pulse at the wrist, cold extremities, clammy perspiration, pallor or an ashy cyanosis, increased respiration, weakness, faintness, restlessness, stupor, unconsciousness, delirium, œdema of the lungs or legs, a rapid enlargement of the liver or heart, a new murmur, weak heart sounds, gallop rhythm, a new rhythm (such as block, fibrillation, flutter, paroxysmal tachycardia or pulsus alternans), a fall in blood pressure and a pericardial friction. The important characteristic changes are a gallop rhythm, shock, fall in blood pressure, and a friction rub. The fall in blood pressure may be instant at the time of the attack, or gradual over a period of days or weeks. It is almost constant. None of these changes may occur in mild cases and none are necessary to establish the diagnosis. Any are important when the diagnosis is in doubt. The persistent pain, with either a leukocytosis or fever, is sufficient to establish the diagnosis.

6. *Embolism.*—Occasionally this is the first sign to suggest the possibility of the disease. It is present in 15 to 18 per cent of cases. A case in point is that of a young man, aged thirty-two, who had five successive severe attacks of pulmonary embolism during three months without signs of venous thrombosis anywhere. Shortly after the fifth attack, a pericardial friction strongly suggested infarct in the right ventricle and this was proved by characteristic electrocardiagraphic changes.

7. *Electrocardiagraphic changes.*—Early in the attack, the so-called "coronary" T wave usually appears. This is one in which the T begins directly at the end of the R wave either above or below the base line, with a kind of plateau or shoulder-like curve, omitting the normal isoelectric line. This T wave is not quite diagnostic of coronary thrombosis, as it does occasionally occur in other forms of heart disease. The important diagnostic feature of the electrocardiagram is the rapid successive series of changes that occur in the shape and direction of the T wave from day to day.

Ten or fifteen days after an attack, in thrombosis of a branch of the left coronary, the T wave tends to become sharply negative in the first and possibly in the second lead, while at the same time the T wave goes up in the third lead. When a branch of the right coronary is affected opposite changes occur in the third and first leads. The T wave tends to go down in the third lead and up in the first lead. After a few months, in favourable cases, these waves may return to normal. Thus, in doubtful cases showing slight symptoms or signs, the diagnosis can be established only by repeated electrocardiagrams. These changes may precede the actual attack. Twice during the last year the writer discovered such changes and put the patient to bed two or three days before the attack of pain actually occurred. In some cases, the electrocardiagraphic changes are delayed as long as a week after the attack.

DIFFERENTIAL DIAGNOSIS

Coronary thrombosis must be differentiated from angina pectoris. The pain of angina is less severe. It is frequently described as only a tightness, or an uncomfortable feeling, or a compression or constriction in the chest on exertion or excitement. It lasts only a few minutes, rarely up to half an hour. The pain of coronary thrombosis, on the other hand, tends to occur lower down the sternum, is more often bilateral and is more widespread than that of angina. It is usually much more severe and lasts for hours or days instead of minutes. Patients with angina stop and stand still in the attack, while some patients with coronary thrombosis are restless and cannot remain in bed. In cases of angina

the following distinctive features of coronary thrombosis are always absent—severe dyspnœa, changes in pulse rate and blood pressure or heart sounds, vomiting, shock, signs of failing circulation, fever and leukocytosis. Electrocardiagraphic changes do occur in angina, but they are temporary, lasting only a few minutes. The importance of distinguishing coronary thrombosis from angina is illustrated by the fact that the operative mortality in coronary thrombosis is six times as high as it is in angina pectoris. Lavine found the cardiac mortality in general heart disease in a series of over four hundred operation cases to be 6.3 per cent; in chronic valvular disease it was 2.1 per cent; in auricular fibrillation it was 3 per cent; in operations on cases with broken compensation, that is, œdema and passive congestion, it was 17 per cent; in cases of coronary thrombosis it was 44.5 per cent. Almost all the literature on angina pectoris previous to ten or fifteen years ago included coronary thrombosis. Now we can distinguish these two diseases with a very fair degree of certainty. There is really very little danger in angina pectoris. Cases seldom if ever die in an attack of real angina. Cases of angina go on and finally die, either of coronary thrombosis or of gradual myocardial failure. Thus the reputation for danger and severity which has been given to angina belongs really to coronary thrombosis.

Pneumothorax gives symptoms very similar to coronary thrombosis. On physical examination, however, one should not overlook this condition. A dissecting aneurysm is almost indistinguishable from it. The electrocardiagraphic changes only might be absent.

Cases that begin with severe epigastric pain and vomiting present the greatest diagnostic difficulty. In gallstone attacks there is usually a history of repeated similar attacks in past years. It is possible in rare cases of gallstone colic for the pain to go up over the chest toward the left breast. If, however, it goes to the neck or down the arms it almost certainly is not due to gallstones. A tender gallbladder or jaundice, together with the absence of any cardiac findings, will usually settle the question. A perforated ulcer will produce more typical rigidity. Rigidity is occasionally present in coronary thrombosis. However, it relaxes on inspiration and a case of coronary thrombosis severe enough to cause the shock and collapse of a perforation would show abundant signs in connection with the heart or circulation, such as dyspnœa, cyanosis, weak rapid pulse, œdema of the lungs, etc. Perforation can be diagnosed easily and with certainty by a fluoroscopic examination, by seeing an air bubble above the liver or outside the stomach. The patients, however, have to sit up for a few seconds for this examination. Fortunately, abdominal rigidity is uncommon in coronary thrombosis and in most cases having epigastric pain, the pain radiates up over the chest, making the diagnosis of cardiac disease probable, or to the arms or sides of the neck, thus fairly well excluding abdominal disease. Furthermore, there is a good chance that cases of coronary thrombosis have a history of previous cardiac disease. A high intestinal obstruction might present difficulties for a day or two. The pain in this condition however would almost certainly go below the umbilicus, it being mid-abdominal, rather than epigastric. Points in the differential diagnosis would be persistent vomiting, signs of abdominal disease and absence of cardiac signs. In a doubtful case, the patient should be taken to hospital and a barium series started.

PROGNOSIS

The prognosis in coronary thrombosis depends on one's ability and care in making the diagnosis. If one recognizes only the severe and so-called typical cases, from 55 to 60 per cent of the cases will die inside of a month or two. If, however, one diagnoses more of the mild cases, the mortality will be much lower, probably between 30 and 40 per cent. The reported mortality varies greatly. Fifty-three per cent of Lavine's cases died within a few weeks. On the other hand, Connor and Holt report an immediate mortality of 16 per cent, that is, within one month. Obviously the percentage who die increases steadily, depending on how long one follows the cases. Parkinson, in 1928, reported 100 cases which excluded all who died at the very onset. Of the 100 who survived the first day or two, 12 died inside of one month; 11 died in the next six months; and 7 in the next two years. The average length of life after an attack has been variously estimated from two to three years. The longest case reported has lived 18 years. After one attack, there is about a 40 per cent probability that a second attack will occur. The prognosis thus is very much more serious than that of angina pectoris. If one follows 100 cases of angina pectoris for five years, the mortality will be about 30 per cent. Out of a series of 287

cases of coronary thrombosis followed by Connor and Holt 25 were living and well at the end of five years. This does not mean that all the rest are dead, but that those who have survived have not yet reached the five year period. Ninety-two more are still living, but have survived various shorter periods, from three months to four years. The prognosis is worse in cases having high blood pressure, marked signs of arteriosclerosis, serious electrocardiagraphic changes, and great cardiac enlargement. The exercise tolerance is the best guide to the functional efficiency of the heart. Cases of hypertension that have had coronary thrombosis usually have a much lower or normal blood pressure afterwards. Cases of angina having had coronary thrombosis subsequently are frequently free from angina. On the other hand, the reverse is also true; that is, many cases that have not had angina before an attack of coronary thrombosis do have it afterwards.

TREATMENT

In treatment, the first essential is morphia. In severe cases, give gr. ½ at once hypodermically, and repeat gr. ¼ every 20 or 30 minutes until the pain is relieved. It is wise to give enough to put the patient to sleep. If the pain be moderate, start with gr. ¼. Amyl nitrite and nitroglycerin are useless and harmful, because they tend to produce tachycardia and further reduce an already falling blood pressure. In average cases, no other medication is ncessary. In cases of collapse, however, with disappearance of the pulse, large intravenous or intramuscular injections of caffeine sodium benzoate and strophanthin should be given. Five minims of adrenalin chloride should be given intramuscularly. Digitalis should not be used except to slow the rate, should auricular fibrillation or flutter occur and in cases that later on develop circulatory failure. In early stages, with œdema of the lungs, dyspnœa and cyanosis, an oxygen tent is valuable. For attacks of unconsciousness due to complete heart block, adrenalin chloride should be given intramuscularly in doses of ½ cc. every four hours. If paroxysmal tachycardia develops, give one full dose of strophanthin (1/75 to 1/100 grain) intravenously, and give by the mouth 15 gr. of quinidine sulphate every two hours, up to 8 doses in 24 hours. If the normal rhythm returns, give 5 gr. of quinidine sulphate twice a day to prevent the recurrence of the tachycardia. Careful nursing is essential. No visitors should be allowed for two or three weeks. The diet should be fluid for the first two or three days. The patient should be fed by a nurse for two weeks in severe cases. Do not give a purgative for the first two days. It might be well to encourage a degree of constipation, until the period of rupture is over, by giving only a mild purgative with an enema, possibly every second day, unless tympanites be present. Nurses should be warned to report immediately the onset of pain in one or both legs or feet, and in such cases the patient should be examined for embolism without delay. One of the most frequent sites for an embolus to lodge is at the origin of the profunda femoris, at the bottom of the Scarpa's triangle. If gangrene threaten, an attempt must be made to remove the embolus with the secondary clot; otherwise, the resulting gangrene will almost certainly be fatal. The sooner the operation is performed, the easier and more successful it will be. Before finally suturing the artery, the pressure on it should be relaxed momentarily to wash out a possible clot that may have formed above the embolus.

Absolute rest in bed is imperative for several weeks. The period of four to six weeks commonly recommended is too short for average or severe cases, but is adequate for mild cases. Average cases call for at least eight weeks and severe cases ten weeks or twelve weeks in bed. Following this, the patients should get out of bed slowly and resume exercise gradually They should sit in a chair for thirty minutes the first day and increase thirty minutes a day until they are up twelve hours. For the next six months or a year they should lie down twelve hours out of each twenty-four, provided they are well enough to do so. Obviously, patients with œdema will have to remain in bed longer, that is, until the œdema has disappeared, and then for three or four weeks longer. The amount of exertion subsequently undertaken will have to be graded to suit their exercise tolerance.

All cardiologists agree that no operation should be attempted on the cervical sympathetic system in cases of coronary thrombosis. Foci of infection, however, should be searched for and removed after recovery.

SOME UNUSUAL MANIFESTATIONS OF THE INSULIN REACTION*

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SINCE the introduction of insulin into the pharmacopœia in 1922, a rich literature has grown up about the subject. In the space of six years (1923-1929) over one thousand papers have been published on insulin.[1] One of the earliest and most significant problems to be studied with it has been its so-called toxic effects. The following case is concerned chiefly with some unusual and striking results of overdosage with insulin.

Charles M., a male of 21 years, was first seen in the outdoor department of the University Hospital in February, 1928. His chief complaints at that time were loss of weight and weakness. The illness dated back three years, at which time polydipsia, polyphagia, and polyuria were noted. A significant loss of weight had occurred shortly after the onset of these symptoms. Vision through the left eye had been poor since birth, but the right eye as well had shown a tendency to impairment of sight for one year.

Physical examination at the patient's first visit showed him to be somewhat undernourished. Cataracts were present on both sides. The heart and lungs were normal. The knee-jerks were somewhat sluggish. The urine showed large quantities of sugar and diacetic acid. The diagnosis was diabetes mellitus, diabetic acidosis, and bilateral cataract. The patient was placed on a diabetic diet with insulin, and was discharged, after some weeks, on a diet consisting of 55 grams of protein, 280 grams of fat, and 60 grams of carbohydrate. He was to take 60 units of insulin daily with this diet.

On December 6, 1928, the patient was re-admitted to the hospital because of progressive loss of vision, which made it difficult for him to pursue the instructions regarding diet and insulin. Eleven days later, his temperature rose to 103° and he complained of pain in the chest, accentuated by deep breathing. Shortly afterwards, signs of fluid were found at the left base. Because the temperature remained elevated, and the fluid recovered by thoracentesis was purulent, a thoracotomy was performed by Dr. John Alexander on December 27th.

On his second admission, the patient was placed on the same diet which he had received nine months previously. Due to a fall in his tolerance, however, it was considered wise to gradually increase the amount of insulin he received, in order to keep his urine free from sugar. So that in the week prior to operation between 95 and 125 units of insulin were administered daily. During this period insulin reactions were probably occurring as there are references in the nurses' notes to periods of profuse sweating. However, since the patient's temperature fluctuated a good deal through the week, it was difficult to attach the proper significance to this. Through the week following the operation, between 110 and 135 units of insulin were given daily. (See Table II). The urine was thus kept practically sugar-free.

On the evening of January 3rd the patient became very drowsy, and it was almost impossible to awaken him. But his condition improved towards morning, and he was responsive and alert during the next day. The evening of January 4th found it increasingly difficult to arouse the patient. Slight twitchings of the arms and legs, and later of the face, appeared. About one and one-half hours after the onset of the twitchings pronounced clonic convulsions came on, lasting from one-half to one minute. During the next 24 hours, the patient received 325 grams of glucose intravenously, but convulsions persisted, recurring as often as every 5 or 10 minutes. Moreover, the convulsive seizures were repeated on the evening of January 5th, and through the day of the 6th. At 7 p.m., on the latter date, the patient would respond intelligibly when spoken to, and, on the whole, seemed brighter than he had been for 48 hours. Now, twitchings and convulsions would ensue only when he was disturbed. This increased excitability to stimuli persisted for two days after the cessation of spontaneous convulsions and the recovery of consciousness.

The neuro-psychiatric signs and symptoms were among the most interesting features of this case. The character of the convulsions has already been described. On January 9th it was discovered that the patient was able to move his extremities only with much difficulty. On the following day a neurological examination performed by Dr. T. Hill, of the Neurology Department of the University of Michigan revealed the following: "The patient is drowsy, but can be roused. He gives the year incorrectly, but is oriented as to person and place. There are no cranial nerve palsies except of the left internal rectus (congenital). There is fine nystagmus upon fixing laterally. The patient is able to move the right arm better than the left. The biceps and triceps reflexes are obtained on both sides. The patient moves his legs but slightly, and these seem to be involved in a flaccid paresis. The patellar reflexes and right tendo Achillis reflex could not be obtained. The sense of motion and of position as well as the vibratory sense are preserved. There is no positive Babinski reflex."

The knee-jerks became normal by January 30th. Following the return to consciousness, the patient displayed intervals of hilarity, followed by cycles of depression. Dr. R. L. Glass, of the Psychiatric Clinic, who saw the patient in consultation, believed that the picture in this case was compatible with that of a symptomatic psychosis. On February 1st, a sudden change occurred in the patient's mental condition; he became entirely rational and continued so for the remainder of his stay in the hospital.

Following the disappearance of the psychiatric symptoms the patient's further course in the hospital was entirely uneventful. The diabetes remained under control, and a cataract extraction was performed. He was discharged on April 15, with 34 units of insulin, and a diet consisting of 60 grams protein, 280 grams fat, and 65 grams carbohydrate. Blood sugar contents with carbon dioxide combining power of the blood and insulin dosages are indicated in Tables I and II.

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TABLE I

BLOOD SUGARS AND CARBON DIOXIDE COMBINING POWER

Date		Blood Sugar (mgm. per cent)	Carbon Dioxide Combining Power (c.c. per cent)
Dec. 11, 1928		130	
" 18		88	
" 20		200	58
Jan. 4, 1929		175	
" 5	3.00 a.m.	240 (5 minutes after 5 grams glucose intravenously)	
	11.30 a.m.	41	39
	4.00 p.m.	60	
	5.45 "	125	
	7.45 "	200	
	8.30 "	234	
	Midnight	245	
Jan. 6		283	29
" 7		295	35
" 8		245	
" 9		241	
" 12		230	
" 22		272	
Feb. 1		217	
Mar. 6		130	

TABLE II

DAILY DOSES OF INSULIN

	Units		Units
Dec. 12, 1928	70	Jan. 5, 1929	63
" 20	105	" 6	30
" 27	125	" 7	35
" 31	118	" 8	28
Jan. 1, 1929	117	" 9	35
" 2	117	" 12	47
" 3	115	" 31	83
" 4		Feb. 26	54

COMMENT

The effects of overdosage with insulin were first recognized in animals[4] by the Toronto group of investigators. Since that time numerous theories have been proposed as to the ultimate cause of the symptoms. Whatever this may prove to be in the end, we know at present that it must produce its effects through the medium of the nervous system, for it has been observed that the early symptoms of insulin shock are similar to those obtained by stimulation of the sympathetic nervous system. Profuse perspiration, tremors, tachycardia, dilated pupils and flushing are usually found, if sought for, in the early stages. Similarly, the later and more severe manifestations of insulin overdosage, such as coma, convulsions, hemiplegias and paraplegias are due also to changes in the nervous system of either central or peripheral origin.

There have been numerous reports in the literature of transient paralyses following an excessive dose of insulin, but in none of the cases did the paralyses last as long as they did in ours. Ravid[5] has summarized this subject in a very thorough manner after reporting a case of his own. Ravid's patient suffered three attacks of transitory hemiplegias, which were associated with only mild generalized symptoms of an insulin reaction. Miller and Trescher[6] have reported a similar instance. Fletcher and Campbell[7] found that one of their cases showed absent knee-jerks, although the question of paralyses is not mentioned.

It has been recognized for some time that the duration of the insulin reactions is a variable factor. By far the majority of reactions encountered are fleeting in character and last only a few seconds, or a few minutes, when the symptoms disappear spontaneously or because of treatment. Somewhat more severe reactions may continue for 15 or 30 minutes, while reactions lasting two or more days have been recorded. Harrop[8] cites a case of a young female in whom the comatose interval of the "insulin shock" persisted about 60 hours in spite of vigorous treatment by intravenous and rectal administration of glucose. The patient finally recovered. We were unable to find any other report in the literature in which the patient remained unconscious for more than a few hours. Our patient could not be roused for 48 hours. Following this, the hyperexcitable period came on and lasted two days; then the paralyses and the psychosis ensued, the latter continuing for three weeks. If all these manifestations are attributed to the effects of insulin, the whole reaction may be said to have lasted a little over three weeks. Apparently the dose of insulin administered determines the duration of an insulin reaction. Both Harrop's and our patient had been receiving large doses of insulin. Another conclusion which may be drawn from some of the protracted insulin reactions is that they will continue in spite of treatment with large doses of glucose.

It is very interesting to find that often the clinical syndrome of the insulin reaction has simulated in striking fashion certain animal experiments. Brain[2] in an excellent paper on the effects of insulin overdosage in animals, was able to obtain many of the signs in rabbits which we observed in our patient. In discussing the appearance of epileptiform convulsions, Brain writes, "Epileptiform convulsions have been observed on three occasions. . . . There was first a tonic stage in which the head was strongly dorsiflexed, the fore-limbs extended, and the hind-limbs on one occasion flexed, and

on the other two extended.'' All of these observations can be applied closely to the case recorded in this paper, inasmuch as our patient assumed an attitude very much like that of the animals observed. However, we did not see in our patient the rolling movement (corkscrew-like) much emphasized by Brain. This investigator was able to induce rolling movements, following the injection of large doses of insulin, and could then reproduce these movements by destroying the vestibular apparatus on one side, or by transecting the eighth nerve. The only evidence of disturbed function of equilibration in our patient was nystagmus, which was present throughout the period of coma, and for a day or two later. Olmsted and Taylor[3] were able to demonstrate hypersensitiveness to external stimuli in animals under the influence of large doses of insulin. These authors noted the presence of the hyperexcitable state between convulsive episodes, so that very slight stimulation of the skin brought on clonic convulsions. This sensitivity lasted for some time, even following the injection of glucose. Banting and his co-workers observed the same responses for six days in experimental animals which received an overdose of insulin. It will be recalled that a very similar condition was present in the case we reported above.

One of the most interesting problems in connection with insulin reactions is their precise relationship to hypoglycæmia. The presence of hypoglycæmia with a reaction was observed early in the work on insulin, and accounted for the names applied to the condition — ''hypoglycæmic reaction'', ''the symptom complex hypoglycæmia''. However, the papers from Toronto shortly after the discovery of insulin, emphasized the fact that hypoglycæmia was not the whole, nor even the most important consideration in the etiology of an insulin reaction. Banting and his colleagues,[4] working with rabbits, were struck by the difference in the blood sugar level in animals which had developed convulsions following the administration of insulin. These investigators found that while most of their animals had convulsions with blood sugars ranging between 42 and 45 mgm. per cent, one rabbit did not show any attack with a blood sugar of 37 mgm. per cent. On the other hand, and what is more important, certain of the animals with blood sugars at 63 and 64 mgm. per cent, did have convulsions. Fletcher and Campbell[7] concluded from their clinical experiences with the drug that the blood sugar level alone did not account entirely for the disturbances seen. They suggested that the phenomena involved were much more complex. Hornung[9] has been able to confirm in dogs Banting's observations given above. Harrop[8] does not believe that hypoglycæmia is the important factor in the production of symptoms of insulin overdosage. Two facts have become obvious as the result of the above laboratory and clinical data. In the first place, a reaction is not always accompanied by hypoglycæmia, and, as a corollary to this, a reaction does not invariably respond to the intravenous administration of glucose.

A few words regarding the prognosis of an insulin reaction will be in place here. The mild reactions, whether treated or not, always end in the complete disappearance of symptoms. Severe reactions terminate satisfactorily, sometimes even without treatment. We can safely say from our experience and from those of others that a reaction which has lasted several days does not point to a fatal outcome. Sporadic deaths have been reported[11] as a result of insulin reactions, but these are of rare occurrence. And the question always arises, in a severe diabetic requiring insulin, whether the death attributed to ''insulin shock'' is not due to a complication of diabetes. Perseverance in the administration of glucose intravenously will usually result in recovery from an insulin reaction. Because a reaction is not a serious matter, and because it indicates that the maximum effect of insulin has been secured, it should not be regarded with undue apprehension. Just as with digitalis, one must give a quantity sufficient to cause mildly toxic symptoms in order to produce the maximum effect, so one should force the administration of insulin until mild reactions are encountered.

The question as to what is the underlying mechanism of the insulin reaction cannot yet be answered any more accurately than we can at present localize the site of action of insulin or indicate exactly the mode in which it acts. Post-mortem findings have not led us nearer to the solution of the cause of insulin reactions, although Banting[4] has described ''a peculiar muciginous degeneration of the subcutaneous tissue of the abdominal wall'' in animals which have died following insulin shock. And Severinghaus[12] has found that ''death following excessive doses of insulin is accompanied by visible

changes in the brain." We must leave the subject at this juncture, until further investigation will throw more light upon it.

SUMMARY AND CONCLUSIONS

1. A case is presented which demonstrates some unusual neuro-psychiatric manifestations of an insulin reaction.

2. Clinical and experimental evidence is offered to indicate that the nervous system is primarily involved in the symptomatology of an insulin reaction.

3. An insulin reaction is not always accompanied by hypoglycæmia, and it does not always respond favourably at once to the administration of glucose.

4. The dose of insulin administered usually determines the duration of the insulin reaction.

5. The prognosis of a severe insulin reaction is good if the patient receives adequate treatment.

6. The underlying mechanism of an insulin reaction still remains obscure.

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NEMBUTAL: AN ANTIDOTE

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NEMBUTAL (sodium-ethyl, methyl butyl, barbiturate), introduced clinically in 1930, is rapidly coming into wide usage as an important factor in combined anæsthesia,[1] as an obstetrical anæsthetic and as an hypnotic. It has also proved its value as an agent capable of affording a check to states of toxic excitement in psychiatric practice. Various contra-indications to its usage are noted, such as high and low blood pressures, arteriosclerosis, and unstable cardio-vascular systems. In a series of approximately 40 administrations we have noted frequently a slight fall in pulse rate. In one case a marked fall in blood pressure occurred, and in another the blood pressure fell to 90/60, the pulse rate to 42, and the respiratory rate to 12. This condition occurred in a young catatonic who had previously shown some tendency to bradycardia. The condition lasted about ten hours. Pituitrin and strychnine had negligible effects. Falls in systolic blood pressure of 20 to 30 mm. of Hg. are reported.[2] In anticipation of a still more extended usage of the drug, and in consideration of the frequently raised objection that when used for anæsthetic purposes the course of the anæsthesia largely passes out of the anæsthetist's hands, once the drug is injected,[3] it was determined to make a search for a possible antidote.

Guinea pigs were chosen for the purpose of experimentation. The lethal dose of nembutal was found to be between 50 and 70 mg. per kg. of body weight: 32 mg. per kg. body weight was found to be a heavy anæsthetic dose, under the influence of which, when injected intra-peritoneally, the guinea pigs might be expected to become unconscious within eight minutes, to remain unconscious for about three hours, and to be ataxic for one or two hours longer.

The effects of acute intoxication.—As over 160 guinea pig injections were made, some conclusions may be drawn as to the action of nembutal in large doses. The predominant feature was marked depression of respiration, the rate often falling to the twenties even after an anæsthetic dose. After a lethal dose Cheyne-Stokes breathing soon occurred and death seemed to be due to respiratory failure, as the heart was noted to be still beating in several cases after respiration had ceased. In three cases the heart was found to be still beating at autopsy, or could be readily stimulated after respiration had ceased for a considerable time. In a number of cases the

breathing became croaking, due apparently to pulmonary œdema.

Cocaine experiments.—Swanson[3] has shown that prophylactic doses of nembutal enable rats to survive three or four times the lethal dose of cocaine hydrochloride. From this it was felt that there might be a valuable antagonism between the drugs. Cocaine hydrochloride alone in doses of 25 mg. per kg. excited over-activity and a marked rise in the respiratory rate in one case to 168 per minute. With doses of 50 mg. per kg. there was a tendency towards convulsions and tonic spasms. The respiratory rate was still increased, but not so marked as with the smaller dose.

A series of guinea pigs was then given the anæsthetic dose of nembutal (32 mg. per kg.) intraperitoneally. This dose was followed at once by a hypodermic dose of cocaine. Controls receiving nembutal only were kept in each series, and the controls checked against the cocainized pigs as to—(1) speed with which unconsciousness set in; (2) length of unconsciousness; (3) duration of subsequent ataxia; (4) respiratory rate. The amounts of cocaine were increased with each fresh series and ranged from 25 mg. per kg. up to 100 mg. per kg. With the lower dose no improvement in the cocainized pigs was to be noticed. At about 80 mg. per kg. the cocainized pigs began to do worse, and at 100 mg. per kg. they showed periods of Cheyne-Stokes breathing and occasional deaths occurred. Our conclusion was that the stimulating dose of cocaine was inadequate to counteract the anæsthetic dose of nembutal, and that one had passed through to the paralytic doses.

Atropin experiments.—Doses of atropin of 50 and 100 mg. per kg. were used as in the cocaine experiment, but without definite results. This experiment was abandoned since rodents are, because of their relative immunity to atropin, somewhat unsuitable for experimentation with this drug.

Ephedrin experiments.—Ephedrin was next investigated, on account of its marked effect, peripherally, on the sympathetic nervous system, and also on the central nervous system. It has been used to arouse animals from chloral narcosis[5,6] and from acute[7] morphine poisoning. Ephedrin hydrochloride was used. The lethal dose of nembutal was injected intraperitoneally, followed by 5 mg. of ephedrin into the heart. Death occurred with equal incidence in the pigs receiving ephedrin and in the controls.

In a second series one pig lived 55 minutes, this being the first indication of promise. The dose of ephedrin was then raised to 10 mg. Two out of 6 pigs lived. Of the 4 that died, 3 showed hæmorrhage into the pericardium; in 1 the heart seemed normal. The dose was then further increased and 35 pigs in all were given doses of between 20 and 30 mg. Those pigs which received 30 mg. received the extra 10 hypodermically. Of the 35 pigs 8 were controls, and of these 7 died, *i.e.*, 12.5 per cent lived. Of the 27 that were given ephedrin 16 lived. Of the 11 deaths 7 of them showed heart injuries, *i.e.*, profuse bleeding into the pericardium, and clotting. One showed gross cardiac disease. In 3 the hearts were normal. The 8 which showed cardiac disease or damage (arising from the puncture) were left out of the calculation, as it seemed quite definite that this disease or damage was the main cause of death. This gave a recovery rate of 84 per cent. The injection of ephedrin did not delay the onset of unconsciousness; it did not shorten the duration of unconsciousness, nor the period of ataxia following the unconsciousness; it definitely improved respiration both as to rate and as to quality.

Repeated doses.—A series of injections was carried out in which the guinea pigs, after having received nembutal, were given 15 to 20 mg. of ephedrin into the heart immediately and 10 mg. hypodermically about half an hour later. This variation did not seem to have any effect upon the mortality or upon the course of the anæsthesia.

Hypodermic doses.—Series were carried out in which doses of 100 and 150 mg. per kg. body weight of ephedrin were injected hypodermically into guinea pigs after receiving nembutal. The administration, however, showed no improvement over the results obtained from administration directly into the heart.

Time of injection.—A series of experiments was carried out to determine how long after the injection of a lethal dose of nembutal one might hope to employ ephedrin with good effect. Pigs were injected with the lethal dose and then given 20 mg. of ephedrin into the heart at varying

SUMMARIZING TABLE

Number of pigs injected with both ephedrin and nembutal	27
Number of controls (nembutal only)	8
Death rate of controls	87.5 per cent
Death rate of pigs receiving ephedrin and nembutal	16 per cent

intervals. It was found that if the administration of ephedrin was delayed for 15 minutes the pig died.

COMMENT

The administration of heavy anæsthetic and lethal doses of nembutal to guinea pigs indicates that the chief cause of death is depression of the respiratory centre.

Nembutal is reported as enabling rats to withstand lethal doses of cocaine, but cocaine hydrochloride was not found to afford protection against lethal doses of nembutal.

Ephedrin hydrochloride, when injected into the heart immediately after a lethal dose of nembutal, was found to offer a very marked protection. While the mortality of pigs receiving the lethal dose of nembutal was 87.5 per cent, the mortality fell to 16 per cent if ephedrin was administered. The dose of ephedrin had to be given within fifteen minutes. The best route was directly into the blood stream. Repetition of the dose offered no particular advantage.

The authors are desirous of acknowledging their indebtedness to Dr. T. A. Pincock, Superintendent of the Manitoba Hospital, for his permission to utilize the clinical and laboratory resources of the Hospital in the preparation of this paper.

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HYPOTHYROIDISM*

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THE present day interest in endocrinology has led to unwarranted views concerning the functions of some of the glands of internal secretion, but in considering disturbances of the thyroid we are on comparatively safe ground because it is one of the endocrine glands whose physiology is fairly well known. We are well aware of the definite results of hyperfunction of this gland and we recognize the borderline types of dysfunction. It is with hypofunction that we are concerned in this paper and, while extreme instances have been recognized for a long time, it is only recently that we are beginning to realize that varying degrees of under-function of this important regulator occur and can be recognized and satisfactorily treated.

A confusion has arisen between the terms myxœdema and hypothyroidism which is of sufficient importance to merit brief attention. The use of such terms as non-myxœdematous hypothyroidism[1] shows clearly that the two are not synonymous. Some writers[2] use these two terms as if the difference between them were a matter of degree, the milder condition being hypothyroidism while advanced thyroid failure is called myxœdema. Others consider hypothyroidism as a term indicating a lowered basal metabolic rate, while myxœdema represents the real picture of thyroid insufficiency.

It is of assistance here to remember that myxœdema is a term that was applied to a definite clinical picture long before our present more accurate methods of study of thyroid function were developed. Myxœdema suggests a condition of pale, dry skin, with subcutaneous pads of rather typical distribution, harsh, dry, sparse hair, and slowed physical and mental activity. Such a picture is always associated with further evidences of decreased thyroid function. Hypothyroidism is the more recent and more accurate term to indicate states of thyroid failure. One of the means of estimating thyroid function is the determination of the basal metabolism. The fact that this is but one of the means should be strongly emphasized. With the widespread use of the simplified form of metabolism determination a significance has been attached to this laboratory procedure which is not warranted. While all cases of thyroid insufficiency show a lowered basal metabolic rate, it must be kept in mind that low rates may be produced by causes other than reduced thyroid activity, a point that will be mentioned again. Hypothyroidism may be mild, moderate, or severe, and myxœdema may occur in any of these. While it is more common in the severe type it may occur in the moderate or even in the mild degree of hypothyroidism, as determined by the basal metabolic rate. It is also possible to have a marked degree of thyroid failure without the picture of myx-

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œdema. Lawrence and Rowe[3] suggest that myxœdema is probably present in hypothyroidism only where a considerable degree of arteriosclerosis is present, and that myxœdema really indicates the presence of some circulatory and renal insufficiency in addition to the deficiency of thyroid.

Myxœdema, then, is a purely clinical term to be applied to a definite condition familiar to all of us. Hypothyroidism is the broader term to cover the whole range of conditions associated with reduced thyroid activity. The clinical importance of this point is that, in many instances, hypothyroidism, even when of the severe type, is missed because of the absence of myxœdema. The danger of waiting for the appearance of myxœdema before diagnosing and treating the hypothyroidism is obvious.

The diagnosis of hypothyroidism must rest on more than a lowered basal metabolic rate, but for convenience the various degrees of hypothyroidism are grouped according to the metabolism determination. The metabolism test is one which permits a considerable range within normal limits. The lower limit is best taken at –10 per cent. Some writers prefer –15 per cent, but when we consider that the errors, if any, of the test tend to raise the readings, –10 per cent is probably the better figure. Lawrence and Rowe[4], in a very considerable experience with carefully studied cases, have selected –10 per cent as the lower limit of the normal.

The present paper deals with adults only and does not include hypothyroid states in children. In the last two years, from September 1st, 1929, to October 1st, 1931, in office practice we have seen 81 adults* having a basal metabolism of –10 per cent or lower. These have been divided into three groups according to the basal metabolic rate. It is not suggested that all of these patients suffered from hypothyroidism; in fact, the majority did not, as judged by the other findings and by their response to thyroid therapy. However, some of them were definitely hypothyroidal and were much benefited by the institution of proper treatment.

In group I (B.M.R. –10 to –15 per cent) there were 38 patients, or 46 per cent of the group. In group II (B.M.R. –16 to –20 per cent) there were 29, or 35 per cent. In group III (B.M.R. –21 per cent and lower) there were 14, or 17 per cent. How many of these patients represent real instances of decreased thyroid activity it is difficult to say. Judging by the response to thyroid therapy in those cases in which it was used, not 50 per cent were really suffering from thyroid deficiency. Many of these patients, particularly those in group I, were not treated with thyroid, since the balance of the clinical evidence often suggested other factors requiring treatment.

In this connection I want to mention briefly one illustrative case.

No. 32, a woman aged 70, seen in December, 1929. Her complaints were weakness, drowsiness, intolerance to cold and dyspnœa. She had gained 14 lbs. in the preceding six weeks. She had been treated for high blood pressure without benefit. She had a pale, dry skin, and was apathetic and sluggish in her movements; there were subcutaneous pads on her forehead, cheeks and above the clavicles. Her hair was coarse and dry and the outer third of the eyebrows was missing. The pulse was 68; blood pressure, 210/100; weight, 164 lbs.; the basal metabolic rate was –15 per cent. There was no pitting, œdema or demonstrable free fluid in the body cavities. On dessicated thyroid, gr. 1, three times a day, she came down in weight 12 lbs. in two months and her pulse rate rose to 100; blood pressure, 170/100. The thyroid was reduced to gr. 1 a day and in May, 1930, five months after starting treatment, her weight was 141, a loss of 23 lbs.; her pulse was 82; and blood pressure, 210/100. She was very much improved, both physically and mentally, and has remained so on the continued dose of one grain a day of thyroid. To-day she feels well, her pulse is 80, blood pressure, 200/110; weight, 140 lbs., and basal metabolic rate, –10 per cent.

Here there is nothing unusual or remarkable, but it illustrates how much disability can result from a mild hypothyroidism, as judged by the basal metabolic rate. This patient was definitely myxœdemic, but with a basal metabolism of only –15 per cent. Her improvement was specific and could only have resulted from proper thyroid therapy. It is to be noted that her myxœdema was accompanied by and probably resulted from her cardio-renal-vascular disease. Other cases might be cited from this series illustrating the poor response to thyroid, even where the clinical picture, including the basal metabolic rate, suggested definite need for such replacement therapy. The only explanation that can be offered for these failures is that the thyroid insufficiency is not the cause of these clinical conditions but is rather a result of some more fundamental disturbance.

ETIOLOGY

Many cases occur without known cause. There are a few well-defined causative factors which can be mentioned:

1. *Infections.* — Hypothyroidism occasionally

*Some of these were patients of Dr. Wallace Wilson who has kindly made his records available to me for the purpose of this paper. All basal metabolic estimations were made at our office by one technician in what we believe to be a satisfactory manner.

follows acute infections, particularly influenza. Focal infection may be a factor in depleting the thyroid. Certain people apparently operate on a very narrow margin of thyroid reserve and may be easily made hypothyroid.

2. *Sexual life.*—Hypothyroidism often develops after puberty, after the menopause, or during or after pregnancy.

3. *Operative.*—It is unfortunately true that some cases follow operation on the thyroid. This is not always a result of removing too much gland. We have no means of estimating the functional capacity of what is left after operation, nor have we means of predicting the patient's thyroid needs. An amount of gland that may serve adequately for one patient proves insufficient for the next. Of this series of 81 patients only 5 had been operated on for goitre.

SYMPTOMS

The many symptoms attributed to decreased thyroid activity are too numerous to mention in detail, but only the most important, those most frequently overlooked, will be noted here.

Exhaustion, or fatigability, is probably the most common symptom, and, while it is by no means pathognomic, it is always of importance. The patient often mentions a definite change in his stamina, in his ability to perform tasks which he formerly did with ease. This complaint is such a common part of that waste-basket of diagnoses, "neurasthenia", that these patients are often so labelled. No such diagnosis should be considered until thyroid disturbance has been excluded.

Menstrual irregularity is very common, not, as is so generally believed, complete amenorrhœa, but a disturbance characterized by prolonged menstrual intervals, followed by prolonged menstrual periods, with a complete arrhythmia of the cycle. Hypothermia, with a marked intolerance to cold, is probably next most common. This may prove a most troublesome symptom and is often the presenting or chief complaint. These patients find that they are only comfortable in a room that their families find intolerably hot and that they require ever-increasing bedcovers at night. Changes in weight are also an important part of the patient's initial story. This change is most commonly an increase, but sometimes a decrease occurs and the diagnosis must not be overlooked because the patient is underweight.

Loss of appetite is the rule, though irregularity may also occur. The characteristic picture is that of small, diminishing appetite with a constant or increasing body weight. Constipation is the usual finding[3] in these patients and one of the bright spots in the management of this group is to be found in the relief of a previously intractable constipation by suitable thyroid therapy. There is an atony or lethargy of the bowel comparable to that characteristic of their general physical state. Headache is more common among these patients than is generally recognized, sometimes accompanied by vertigo, but more often a dull, generalized aching, more or less constant, but more severe when they are tired.

Diminished perspiration is sometimes noted, and is always worth consideration in diagnosis. It accompanies the harsh, dry skin and the dry and falling hair, to be mentioned again under physical signs. Certain ill-defined, yet important, personality changes are frequently noted by the intimate associates of the patient. Unusual irritability, apathy to all things, loss of memory, or loss of ability to concentrate are common. The patients are usually depressed in spirits. Latent psychotic states may be intensified by the onset of hypothyroidism[6]. Loss of sexual power, with impotence in the male and sterility in the female may occur.

Other symptoms occur occasionally, such as paræsthesias, consisting of numbness and tingling of the hands and feet; indigestion with nausea, and vomiting and occasional jaundice and such cardiac symptoms as palpitation and dyspnœa.

PHYSICAL SIGNS

The general appearance is often, but not always, extremely suggestive. Here again it should be emphasized that it is not wise to wait for a myxœdemic habitus before making the diagnosis of hypothyroidism. The skin is usually dry and cold, often so dry as to be scaly. Pallor is the rule, and while this is usually waxy it may occasionally assume a yellowish tint. The hair is harsh and dry and alopecia is common. There may be a complete loss of hair all over the body, or only in limited areas, as on the scalp. One very suggestive change in hair distribution is the loss of the outer one-third or one-half of the eyebrow.

The weight is usually over the estimated normal, though underweight is not uncommon[7]. In spite of the extra weight these patients are obviously in a poor state of nutrition. Sluggishness of mental and physical activity is usually noted in the examination. The patient responds

slowly and uncertainly to the simplest questions used in eliciting the history. His movements are usually slow and uncertain. Often he has difficulty with the finer movements, such as unbuttoning his clothing.

Cardiovascular examination reveals evidence of considerable importance for diagnosis. The pulse is slow and regular and the blood pressure is usually low. A complicating hypertensive cardiac disease may cause a hypertension, but systolic readings of 100 or less are most common. A low pulse pressure has been noted[2]. The heart is not enlarged in uncomplicated cases, though there may be a condition of chronic myocardial degeneration dependent on or complicating the thyroid insufficiency, with a resulting large heart, the so-called "myxœdema heart". The heart sounds are of poor quality, being weak and distant. As already mentioned, in myxœdema there is always some evidence of circulatory or renal insufficiency.

LABORATORY FINDINGS

There is always a lowered basal metabolic rate. As already mentioned, the lower limit of the normal for this determination is –10 per cent; the rates vary from there down. The ordinary case of hypothyroidism falls normally between –15 to –25 per cent. The lowest figure in this series was –28 per cent; the lowest case I have seen was –43 per cent, though instances are recorded of a basal metabolic rate of –50 per cent or lower. Here again it must be emphasized that a low basal metabolic rate does not always mean hypothyroidism, and this test must be evaluated, as every other laboratory test must be, in terms of the patient's history, symptoms and physical findings. One point worth emphasis here is, that, while it is generally recognized that the basal metabolic rate should be based on more than one estimation when dealing with hyperthyroidism, the same necessity, when dealing with hypothyroidism, is frequently overlooked. A first determination of –8 per cent, for instance, may, on a second test, be shown to be –18 to –20 per cent, the higher figure resulting from the emotional upset of the test, etc.

An electrocardiogram may show a very typical picture in which, while the waves are of normal configuration, the low voltage present in each lead shows the reduction in cardiac activity. The red cells and hæmoglobin are usually reduced and the anæmia may be of considerable degree. It is usually of the secondary type with low colour-index. The white cell count is normal, but the differential often shows a reduction in the polymorphonuclear cells with an increase in the lymphocytes. Means has recently[9] reported five instances of the coexistence of myxœdema and pernicious anæmia.

The urine is ordinarily normal but albumin and casts occur in a sufficient number of cases to have given rise to the term pseudonephritis[10]. Gastric analysis reveals normal or low acid values. Achlorhydria occurs occasionally[5]. X-ray examination of the gastro-intestinal tract, which is valuable to eliminate the possibility of organic disease, will often reveal the atony so characteristic and so commonly the cause of the obstinate constipation.

DIFFERENTIAL DIAGNOSIS

1. *Nutritional disturbance.*—Under this heading occurs a group of conditions frequently associated with such reduction in vitality as to lower the basal metabolic rate. This nutritional disorder may result from an insufficient caloric intake or, what is more common, the trouble may arise as a result of a qualitative deficiency. Protein inanition will produce a lowered basal metabolic rate. It is essential, therefore, to question the patient about his diet preceding the onset of symptoms. Where doubt remains the therapeutic test will settle the question. A diet of adequate caloric value, with sufficient protein, must be included in the treatment of either condition.

2. *Pernicious anæmia.*—Here the pallor, the dry skin, the absence of weight loss, and the physical and mental apathy may suggest hypothyroidism. Paræsthesias may be common to both conditions. The blood picture in thyroid failure may simulate the pernicious type, though, as is well known, there is no constant blood picture in pernicious anæmia. The two diseases may coexist[9]. The basal metabolic rate proves the distinguishing feature.

3. *Chronic nephritis.*—The so-called pseudonephritis of hypothyroidism[10] with albumin and casts in the urine may cause confusion The adequacy of renal function, as judged by concentration and dilution tests and the absence of retention of nitrogenous products, serves to distinguish hypothyroidism from chronic nephritis. The lower basal metabolic rate in the former and the prompt response to thyroid therapy are of further value.

4. *Latent tuberculosis* is apt to cause confusion, especially in the underweight group[11].

Diagnostic confusion is apt to occur with various chronic debilitating conditions. Again the basal metabolic rate and the response to thyroid therapy are the chief means at our disposal to distinguish the cases of true thyroid deficiency. Again it must be emphasized that the diagnosis should not rest on a low basal metabolic rate alone.

TREATMENT

There is little to be added to what is general knowledge regarding the treatment of hypofunction of the thyroid. There are several reliable varieties of thyroid preparations on the market. Some of these are dispensed in tablets representing the dessiccated gland, while in others the whole fresh gland is used as the basis of dosage. Naturally this makes a difference in the required dose. The dried gland is 3 to 5 times more potent than the fresh gland. Equivalent doses, therefore, are one grain of the dessiccated gland to three to five grains of the fresh gland. The best practice is to always use one preparation of known potency and to become thoroughly familiar with that preparation. The initial dose used must be greater than the later maintenance dose. For a hypothyroidism accompanied by a basal metabolic rate of −20 per cent the usual initial dose is one grain of the dessiccated gland or five grains of the fresh gland three times a day before meals. This dose may have to be increased or diminished to suit the patient. Evidences of over-dosage are shown by such slight symptoms of thyroid intoxication as palpitation, tremor, tachycardia, and too rapid loss of weight. These moderate evidences of thyroid intoxication need occasion no alarm. They promptly disappear when the thyroid treatment is temporarily discontinued.

The subjective improvement noted by patients under treatment is often remarkable. They seem to become years younger, their physical and mental augmentation is most satisfactory. Often it takes a month or even more before this beneficial effect reaches its maximum. This delay in response to thyroid therapy occasionally discourages both the patient and doctor and I have seen cases where a most happy outcome resulted from a perseverance in treatment after both were ready to discontinue it. Occasionally, thyroid therapy throws an additional strain on the heart muscle sufficient to produce such evidence of decompensation as pain or dyspnœa. This danger, while a possibility, should not be regarded as a contraindication to thyroid. In such cases adequate rest, even to absolute bed rest during the early part of thyroid treatment, will prevent this complication. Morphine is poorly tolerated by these patients[13] and should be exhibited with caution.

As already frequently mentioned, the response to treatment is an important factor in diagnosis. Some cases occur which give every indication of hypothyroidism, as symptoms, signs and lowered basal metabolic rate, but which fail to respond to thyroid therapy. We are forced to conclude then that these are not true instances of thyroid failure, but that the symptoms, signs and lowered basal metabolic rate result from other causes. When a case fails to respond to adequate thyroid treatment which has been continued for a sufficient time it is definite evidence that we are not dealing with a hypothyroidism.

Thyroxin is, no doubt, the most accurate preparation we have to treat these patients, but for general use the type of thyroid tablet already referred to is probably most satisfactory. The use of polyglandular preparations can only be mentioned to be condemned. If they possess any virtue at all it is from their thyroid content. The accepted facts in endocrinology indicate that only the thyroid, adrenal, pituitary and islet tissue of the pancreas have as yet been shown to lend themselves to treatment of the clinical conditions resulting from disturbance of function of their respective glands, and in all these cases the treatment is entirely specific. Insulin is of value only to the diabetic and thyroid only to the hypothyroid individual.

Treatment should include regulation of the diet, to ensure proper balance of the various necessary factors. Focal infection should be eradicated. It has been frequently noted that the thyroid needs of an individual vary with the presence of a complicating infection. During an acute illness, for example, an increased amount of thyroid substance may be necessary to carry these patients. Occasionally the eradication of foci will permit reduction in the maintenance dose of thyroid.

CONCLUSIONS

Hypothyroidism is a common clinical condition which produces considerable disability and which responds remarkably well to specific treatment.

Not all patients showing a lowered basal metabolic rate are suffering from hypothyroidism.

The diagnosis must be based on the history, symptoms and physical signs, confirmed by the basal metabolism determination and clinched by the response to treatment.

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INTESTINAL OBSTRUCTION*

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DURING the past ten years a great deal of study has been given to the subject of intestinal obstruction. In this period many important findings have been recorded, and although the conclusions of various investigations have at times been contradictory our conception of the subject has been greatly clarified. It would appear to be of value, therefore, to reconsider some of the more important advances and to endeavour, if possible, to correlate them in a general summary of the subject which should be of value to the general surgeon.

Before proceeding with such an analysis one fact must be emphasized, namely, that in spite of all the study devoted to this subject the mortality rate continues to average about 30 per cent. In clinics, however, in which the subject is being intensively studied the mortality is much lower. Holden, for example, reports 5.5 per cent mortality in a series of 58 cases. This splendid result is not due to the application of therapeutic measures recently advanced but to the fact that the cases were diagnosed early and the obstruction immediately relieved. Delay remains the greatest factor in the high mortality rate. This rate is directly proportional to the number of hours elapsing between the onset of the obstruction and its surgical relief. Many published tables have confirmed this finding (Tuttle, Finney, Moore), for example, that of Moore[1] who gives the following figures:—

Onset of Symptoms to Operation	*Mortality Per Cent*
0 - 24 hours	0
24 - 48 hours	25
48 - 72 hours	33
72 plus hours	65

Few surgeons realize in practice, however much they may do so in theory, the importance of a single hour's delay. Delay in operative relief is the most important single factor governing the mortality rate in intestinal obstruction.

When a careful history is taken and a thorough physical examination carried out, the typical case will offer few difficulties in diagnosis. The sudden onset of colicky abdominal pain, with vomiting, absolute constipation, visible peristalsis or distension, unaccompanied by fever or marked leucocytosis, immediately suggests intestinal obstruction. It is not always, however, that such typical symptoms are found. Often the patient has had morphine before the surgeon arrives and the pain is not marked. A recent patient, suffering from the severe vomiting of pregnancy, suddenly developed small bowel obstruction; here the diagnosis of the latter condition was, naturally, quite difficult. Many such examples spring readily to mind. It is necessary, therefore, to have a clear conception of the subject of intestinal obstruction based on a physiological point of view, and recent research has largely been devoted to such a study.

Small bowel obstruction is usually due to adhesions or herniæ. Occasionally a Meckel's diverticulum, twists, gall stones or tumours are found to be the etiological factor. In children the possibility of intussusception must always be borne in mind. It is important, therefore, to examine the hernial orifices and the abdominal wall for previous scars which might suggest adhesions, and also to find out if there is any history suggesting tuberculous peritonitis, which so frequently leads to adhesions and obstruction.

It has been stated that the high mortality is due to delay in diagnosis and operation. What are the reasons for such frequent delay? First, the failure of the family to call in a doctor early; secondly, the administration of morphine by the doctor, which masks the symptoms; thirdly, the fact that the symptoms themselves tend to change as the hours pass.

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Let us consider the subject of pain. In acute small bowel obstruction the pain is usually very severe at first, and for a time constant and frequently localized, due apparently to the spastic contraction of the bowel caused by the irritation of the obstructing mechanism. This later gives way to the generalized, rhythmical, colicky pain due to hyper-peristalsis, as the bowel endeavours to overcome the obstruction. Between these contracting waves there is comparative relief of the pain. As the bowel gradually becomes fatigued and distended, the hyper-peristalsis is lessened and pain is much less acute. In strangulated obstruction pain is often less severe when the bowel becomes gangrenous. In paralytic ileus pain may be almost absent. It is evident, therefore, that as the pain is largely due to violent contractions of the bowel it is greatly diminished with fatigue of the bowel. Too great emphasis, therefore, on a possible lack of the severity of the pain in late cases may lead to an error in diagnosis. With this lessening of pain there will also be found absence of visible peristalsis, which will not be seen when the bowel is fatigued. It is usually visible only during the periods of severe colicky pain. Auscultation during these attacks will also reveal the gurgling of gas as it is pressed along by the wave of hyper-peristalsis. These signs also are of little value in late cases after the bowel has become fatigued and almost paralyzed. It may be stated that after twenty-four hours increased comfort means fatigued bowel rather than improvement, and should be alarming, not consoling.

The second most characteristic symptom of intestinal obstruction is vomiting. At first it is a reflex phenomenon dependent on the sudden irritation of the bowel. At this time it is frequently almost explosive in character and serves the purpose of emptying the stomach. There is then often a pause until the hyper-peristalsis causes a retrograde flow of duodenal contents into the stomach which are finally vomited. Fæcal vomiting, which really involves the contents of the jejunum and upper ileum, is often considered diagnostic of intestinal obstruction. It is also prognostic of a 50 per cent, or even higher, mortality. Surgical intervention should always be initiated before fæcal vomiting is present. The frequency of vomiting depends largely on the amount of water ingested. Unless the patient takes fluids, vomiting may be quite infrequent. I have seen patients lie for twelve hours without vomiting. As the bowel and stomach become fatigued and distended they fill up with gastric and intestinal secretions, the overflow of which is regurgitated, usually as greenish black vomitus. These are late cases as a rule. The stomach may suddenly empty itself by vomiting, or an enterprising clinician may wash out the stomach, which will often give great relief of symptoms for hours, but the stomach finally fills up and no permanent good has been accomplished. In fact, the increased comfort may lead to still further death-dealing delay. I am speaking only of cases of mechanical small bowel obstruction. In paralytic ileus this type of vomiting is frequently present and the comfort induced by vomiting, or by gastric lavage, is valuable in the relief of symptoms.

Another frequent cause of delay in diagnosis is the fact that, following obstruction, the bowels may move, or early enemata be effectual. I have seen an original diagnosis of intestinal obstruction wrongly changed on receiving such reports. There should be no difficulty in realizing that at the onset of the obstruction the large bowel may contain considerable fæcal matter and gas, which may be passed spontaneously or as the result of early enemata. However, once the bowel is emptied the constipation becomes absolute and further enemata are ineffectual. This again does not apply to paralytic ileus.

Distension is marked in large bowel obstruction but is often insignificant in early small bowel obstruction, especially when the obstruction is high. It may be hardly visible clinically for the first twenty-four hours. Increasing distension is always suggestive of obstruction, but it should be sought for early by means of an x-ray picture; one should not wait until it is recognizable grossly.

Unless intestinal obstruction is relieved promptly the patient rapidly progresses downwards. The pulse steadily increases in rate and becomes of poor quality; symptoms of shock rapidly supervene with pallor, slight cyanosis, clammy skin, increasing distension, and a regurgitant type of vomiting of greenish black fluid. Although anxious, the patient usually remains mentally clear almost to the end.

The symptoms of onset, therefore, depend largely on the irritated bowel musculature. As the bowel becomes fatigued a gradual change occurs and symptoms, due to toxæmia and dehydration, become most marked. Diagnosis must be made early and every means available to make an early diagnosis should be used.

Some years ago it was pointed out by Case[2] that among the most useful was the intelligent use of the x-rays. By this means, and without the ingestion of any opaque material, distended bowel is visible very early. Largely due to the interest of Dr. C. B. Keenan during recent years, the value of the use of x-rays in these cases has been repeatedly demonstrated at the Royal Victoria Hospital.

Normally the small bowel is practically empty as the semi-fluid contents pass along, leaving insufficient time for fermentation, or for the growth of gas-forming anærobes. With obstruction there is immediate arrest of this flow, and gas and fluid soon collect above the obstruction which is visible by means of x-ray plates at a very early stage. If a simple antero-posterior view be taken of the abdomen, preferably with the patient standing up or lying on the side, the distended loops of bowel will be clearly visible with many fluid levels. It must be borne in mind that the stomach and large bowel may show such fluid levels normally and considerable experience is frequently necessary to differentiate small bowel from large bowel. Distended loops of small bowel showing fluid levels are diagnostic of small bowel obstruction. In low obstruction and in paralytic ileus the loops tend to lie in parallel rows, the so-called ladder pattern (Treves)[3]. In addition to these findings a series of fine parallel shadows will sometimes be seen radiating from the margin, partially across the bowel, the so-called "herring-bone pattern". These are presumed to be due to the valvulæ conniventes. It has been suggested by Keenan, after a large series of observations, that these "herring-bone" shadows are only visible in mechanical obstruction and not in cases of paralytic ileus. Further, they are probably present only when the obstruction point is fixed, as in the absence of fixation the bowel may move and the shadows thus become blurred and invisible. This suggestion, if confirmed, should prove of great value in differentiating post-operative mechanical obstruction from paralytic ileus.

It is, therefore, of great importance, as soon as an obstruction is suspected, to take a single antero-posterior view of the abdomen with the patient in the upright position or, failing that, lying on the side. This should be an emergency x-ray examination, to be carried out immediately there is a possibility of obstruction being present. In this way earlier diagnosis can frequently be made, and one approaches laparotomy with much more confidence in the correctness of the diagnosis.

Before entering into a discussion of the etiological factors playing a rôle in the cause of death in cases of intestinal obstruction, it might be advisable to review the recent advances in our knowledge concerning this aspect. No subject has received more intensive study than that of intestinal obstruction and no subject has proved itself more complex or more open to controversy. Based on the work of Whipple[4] and his co-workers, it was generally believed that death was caused by the absorption of a toxin. They were able to produce a toxin from the obstructed bowel which on intraperitoneal, or intravenous injection in another animal caused death with symptoms somewhat similar to those developed in the first animal. From these toxic bowel contents, they were able to isolate a hetero-proteose which appeared to be the toxic factor. This theory of toxæmia dates back to Amussat in 1838[5], and has had numerous supporters up to the present time. In 1912, however, Hartwell and Hoguet[6] observed that they could keep dogs with simple small bowel obstruction alive for three or four weeks, provided that they made up the fluid lost through vomiting by giving them normal saline solution intravenously. They were consequently led to believe that dehydration was the cause of death in these cases. At the time they laid more stress on the loss of water than on the loss of sodium and chlorine ions in the vomitus, which has since been shown to be the important factor. In 1920 MacCallum and his co-workers[7] showed that when the pylorus was obstructed in dogs, blood analysis revealed a loss of plasma chlorides and an increase in CO_2 combining power. The tetany which occurred could be relieved by the injection of sodium chloride solution. This aspect of the problem has been thoroughly investigated by Haden and Orr[8], Gamble and Ross[9], Gatch, Trusler and Ayers[10], Gamble and McIver[11], and many others.

It is now generally accepted that following high, simple occlusion of the small bowel vomiting causes a rapid loss of sodium chloride and hydrochloric acid. When hydrochloric acid is secreted the acid radical is largely replaced by bicarbonate, so that the plasma chlorides fall while the bicarbonate radical shows a definite and almost proportionate rise. Accompanying these changes there is a marked rise in urea, especially in the

terminal stages which has never been fully explained. If such cases of high obstruction be given sodium chloride subcutaneously or intravenously, the blood chemistry returns to normal. It has been possible to keep dogs with high simple obstruction alive for a month or more by such means. These dogs apparently died finally of inanition.

Haden and Orr suggested that the sodium chloride detoxified the toxins absorbed from the obstructed bowel. There is little evidence to confirm the truth of this assumption, however, and it is likely that they were guided by an endeavour to correlate these new findings with the old belief that death in obstruction is always due to the absorption of a toxin. They further demonstrated that no other salts could be used in the place of sodium chloride. Solutions of the chlorides of potassium, calcium, magnesium, ammonium, sodium phosphate, sulphate and bromide, were ineffectual in prolonging life. The injection of distilled water, glucose solution and sodium bicarbonate solution were also useless. It would appear evident, therefore, that if dogs in which the pylorus or duodenum has been obstructed can be kept alive for a month by simple replacement of sodium chloride solution, whilst they previously died in about 48 hours, then toxæmia probably plays no part in causing death in such cases. Dragstedt[12] supported this conclusion by showing that death is inevitable when total loss of gastric juice is effected in dogs. The blood chemistry in such cases shows the same changes as are found in high intestinal obstruction. Further symptoms may be relieved and life maintained by the injection of Ringer's solution.

Normally the gastro-intestinal juices are being continually reabsorbed as they pass down the gastro-intestinal tract, so that the blood chemistry is maintained. An obstruction, if high enough, causes immediate loss of these secretions; they cannot be replaced and so the changes in the blood chemistry are readily accounted for. In obstruction, therefore, which is low, or in which the gastro-intestinal secretions can be saved, blood chemistry changes should occur later or not at all. It is well recognized to-day, clinically, that in low obstruction the changes in blood chemistry do not occur, or they occur only after several days when vomiting has been marked. Jenkins[13] has endeavoured to confirm this finding experimentally. He devised an operation by which the biliary, pancreatic and duodenal secretions were short-circuited into the bowel below the obstruction. Thus, depending upon the site of the final obstruction, either a high or a low intestinal obstruction was present. With a high obstruction there would be little chance for reabsorption of gastric juice. Such dogs died in twelve days. When the obstruction was made two and a half to three feet below the stomach, the dogs lived from 17 to 33 days. One dog with an obstruction five feet below lived for 17 days. These dogs all showed blood changes similar to those occurring in high intestinal obstruction.

From these observations, and from many others I have made clinically and experimentally, it would appear obvious that in high simple obstruction, where the stomach and upper bowel can empty themselves by vomiting, toxæmia is not a factor in the cause of death, but that death is due to dehydration caused by loss of sodium chloride. It is generally accepted that the water content of the blood plasma is maintained by its total ionic content, which is mainly sodium chloride. With the loss, by vomiting, of sodium chloride to such an extent that it cannot be replaced from available stores, such as the skin and cerebrospinal fluid, water must be thrown off. Injections of distilled water, therefore, are obviously useless unless the total ionic content of the blood plasma is sufficient to hold it in the body. Otherwise it is excreted. Sodium chloride solution can restore the normal total ionic content of the plasma, thus enabling it to retain water and so to prevent dehydration.

What is the situation in low simple obstruction? Jenkins showed that obstructions performed in the manner described above caused death in 33 days when two and a half feet below the stomach, 27 days at 3 feet, and 17 days at 5 feet. Though experiments on such a few dogs are not conclusive they suggest that when the obstruction is lower a new factor enters the situation. Toxic products are no longer vomited but remain in the gut, which rapidly becomes distended. With distension there is impairment of blood supply; the bowel becomes purple and œdematous. It has been shown that healthy bowel will not absorb the toxins which are present in obstructed loops. There is considerable evidence to suggest that the absorption mechanism of the obstructed bowel is greatly altered, Sugito[14], Clairmont and Ranz[15], Kuhala[16], Davis[17]. It is very probable then, that in low obstruction the reason that life cannot be maintained for prolonged periods by the injection of sodium chloride solution is that

here dehydration is not the only factor causing death, but that the toxic products known to be present above an obstruction are absorbed through the partially devitalized bowel wall.

Still a different picture is seen when a strangulated obstruction is present. Here in addition to simple occlusion of the bowel lumen there is an impairment of the blood supply of a loop of gut. The result is that this loop rapidly becomes distended, fills up with intestinal secretion mixed with the products of partly digested food and bacterial toxins. Further, œdema of the bowel wall with early necrosis and even gangrene occur. With this type of case the blood picture is altered very little. Loss of chlorides is only present when the obstruction is high, or if the vomiting is severe. As a rule, however, this loss is insignificant and death occurs early in spite of frequent injections of sodium chloride solutions. Life cannot be prolonged, as a general rule, in strangulated obstruction by the administration of sodium chloride. It is evident then that dehydration and blood chemistry changes play an insignificant part in causing death in this type of case. Here, apparently, death is due to absorption of toxins alone.

Dragstedt[18] has shown that when the blood supply is cut off from the obstructed loop of bowel death occurs early. If, however, this loop of bowel be first sterilized and then the ends inverted and the loop strangulated, death does not occur. The animal is able to resolve and absorb this devitalized, sterile bowel without serious symptoms. This points very strongly to the toxic factor having its origin in the lumen of the bowel. With the marked changes that go on in the strangulated bowel, leading gradually to gangrene, absorption of the toxic factor is apparently permitted.

Many efforts have been made to isolate the toxic principle causing death in these cases. It has been suggested that it is histamine, heteroproteose, incompletely broken down proteins, products of the growth of anærobic bacteria, such as *B. Welchii*, and many others. Certainly the bowel contents are of a very complex nature, all the above products being present, and all apparently being very toxic when absorbed. My own belief is that, with the road to absorption of toxins opened by necrosis or ulceration of the bowel, many of the toxic principles found in the obstructed bowel are absorbed, and, perhaps, all play a part in causing the death of the animal. It has been repeatedly shown that the contents of the bowel above an obstruction are toxic. In my own experiments I have found that when such contents, which are exceedingly foul-smelling, are passed through a Berkefeld filter the filtrate is remarkably toxic, small doses killing mice on intraperitoneal injection. Williams[19] has pointed out that the toxæmia of obstruction gives symptoms similar to those associated with gas gangrene and produced by the *B. Welchii*. *B. Welchii* is a constant inhabitant of the bowel, being present in large numbers in the lower bowel, though to a much smaller extent in the upper bowel. I have isolated the organism from the jejunal contents and have found it constantly present in large numbers above obstructions produced as high as the jejunum, in dogs. Williams has grown this organism from the vomitus obtained from cases having intestinal obstruction. It has frequently been asked (Cooper[20]) why death occurs earlier in high obstruction than in low obstruction if *B. Welchii* toxin is the cause of death. This has been answered previously in the discussion concerning the early cause of death by dehydration in high obstruction.

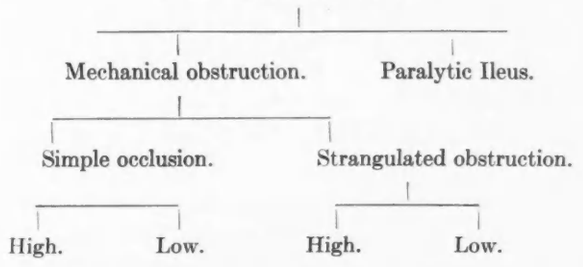
Death in obstruction is evidently not due to widespread dissemination of *B. Welchii* throughout the tissues, as no gas has ever been noted in the tissues at autopsy. It could conceivably be due to absorption of its toxins. In an effort to prove that such was the case Williams injected one set of mice with small doses of material taken from obstructed bowel, obtaining a mortality of 50 per cent. He then injected a second series of mice with equal parts of a similar amount of obstructed bowel contents and of *B. Welchii* antitoxin. Of this second group none of the mice died. He concluded then that this antitoxin was able to neutralize the toxin causing death in intestinal obstruction. Morton and Stabins[21], investigating this effect of intestinal obstruction, found some evidence to support these contentions. The fact, however, that the toxins found in the bowel contents above an obstruction are not destroyed by boiling, whereas the toxin of the Welchii bacillus is readily destroyed by heat, would tend to throw some doubt on the conclusions of Williams. In my own experiments I have been unable to confirm the findings of Williams. In these experiments the contents of the bowel above an obstruction were filtered through a Berkefeld filter, which process sterilizes the material but does not remove the toxic products. The lethal dose for mice of this sterile, toxic filtrate was then

found by means of intraperitoneal injections of various amounts. On injecting this lethal dose with an equal amount of *B. Welchii* antitoxin no reduction in mortality rates were shown. This finding applied to a series of four cases and certainly in these it was apparent that this antitoxin did not lessen the toxicity of the bowel contents.

It is, however, quite possible that in a complex toxic mixture, such as is found above an obstruction where broken down protein, vitamins, heteroproteose and the toxins of many organisms are present, that bacterial toxins when absorbed may play a part in the toxæmia of intestinal obstruction. I do not consider it the only toxin, and the identification of any single toxin is beyond the scope of the present article. For a review of the literature in this regard, a study of Cooper's recent article[20] is of considerable interest. The literature is very contradictory, due to a failure to realize that many toxins are present in the obstructed bowel, and that many of them on absorption may hasten death. The toxic filtrate from an obstructed loop is quite harmless if taken by mouth. It is not absorbed by the normal bowel. This is further evidence that the absorption of toxins depends upon distension, œdema or ulceration of the bowel.

It is evident, therefore, that a discussion of small bowel obstruction early demands differentiation of the subject into several groups. High simple obstruction presents a somewhat different picture from both low simple obstruction and from strangulated obstruction. The following table is presented in an effort to differentiate the various types of obstruction which show on close examination marked differences in type.

SMALL BOWEL OBSTRUCTIONS



Unfortunately, most clinical cases of intestinal obstruction belong to the strangulated variety. Here, loss of vitality of the intestinal wall occurs early, with presumably an early absorption of toxic material. Only early surgical relief will lower the high mortality which occurs generally in this type of case. In simple high obstruction death is due almost entirely to the loss of sodium chloride in the vomited gastro-intestinal secretions which results in marked dehydration. Subcutaneous or intravenous injections of sodium chloride solution will prolong life and turn a poor surgical risk into a good one. In low simple obstruction loss of gastro-intestinal secretions by vomiting is again a serious factor, but in addition, as the bowel distends and becomes injected and œdematous, absorption of toxins occurs and death is due to both factors. In strangulated obstruction death frequently occurs before the upset of the normal blood chemistry is at all marked, the patient succumbing to an overwhelming toxæmia.

It is thus very evident that early diagnosis is imperative and must be immediately followed by the relief of the obstruction, as it is often impossible to differentiate simple from strangulated obstruction clinically. While this is going on the blood should be analyzed quantitatively for chlorides, CO_2 combining power and urea. Therapeutically, intravenous or subcutaneous sodium chloride solution, istonic or hypertonic, should be injected in large quantities to overcome any dehydration which may be present.

CONCLUSIONS

1. Delay between onset of symptoms and operative relief is the most important factor governing mortality in small bowel mechanical obstruction.

2. X-rays are useful in establishing an early diagnosis.

3. In high obstruction loss of sodium and chlorine from the blood plasma by the vomiting of gastro-intestinal secretion causes dehydration which finally results in death.

4. In low obstruction gastro-intestinal secretions are re-absorbed to some extent, but alterations of the bowel wall allow absorption of toxins and death results from toxæmia.

5. In strangulated obstruction dehydration is relatively unimportant, early bowel damage allowing absorption of toxins, and death is due to toxæmia.

6. In all cases of obstruction the blood chemistry should be closely watched for loss of plasma chlorides, increase in urea and alkalosis (increased CO_2 combining power).

7. Any such change demands free intravenous and subcutaneous injections of normal or hypertonic (300 c.c. of 5 per cent) sodium chloride solution.

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INTESTINAL OBSTRUCTION CAUSED BY NORMAL PREGNANCY

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THE question of intestinal obstruction caused by normal intrauterine gestation has received, apparently, a good deal more consideration in Europe than in this country, if one may judge from the literature. It is readily apparent that though normal pregnancy alone may be the sole known cause for the obstruction yet each speaker seems content to present his case report and leave the explanation to his audience. The discussion which follows the presentation of such cases manifests usually the same indecision. No doubt one very good reason for the French indecision is based on the statement of Pinard in 1902, quoted by LePage,[1] "There is no need to begin another chapter in puerperal pathology entitled 'Intestinal Occlusion of Pregnancy'. I have never seen intestinal occlusion complicate a normal pregnancy."

The explanations offered by the various French and German writers are varied. The French writers discuss the anatomical causes in abdomens without previous surgical intervention and so without adhesions as far as is known. Sencert and Cuneo called attention to the intestinal occlusion caused by a loop of bowel caught and held by the infundibulo-pelvic ligament, the latter being held taut by a gravid uterus rising into the abdomen. Professor Vautrin,[2] of Nancy, in 1922 presented two cases of acute intestinal obstruction caused apparently by normal pregnancy.

In discussing these cases Vautrin pointed out the "colic angulation" caused by the tense infundibulo-pelvic ligament, the stercoral accumulation adding to the trouble, and the two causing obstruction. He advised enterostomy. The gravid uterus was not disturbed. In neither case was a history of previous abdominal trouble discussed. The cases are cited chiefly because of the mode of treatment carried out.

Ludwig,[3] in 1913, assembled 96 cases of intestinal obstruction occurring during pregnancy. He found the condition most common in the 3rd and 4th months and again in the last 3 weeks of pregnancy. These cases were perhaps in part aggravated by the pregnancy, but none could be directly attributed to the pregnancy alone.

In 1918 Fleischauer[4] reported two cases—one, a woman pregnant four months, with severe obstruction and peritonitis. At laparotomy no cause for ileus was found. Colostomy was done. Death occurred immediately. At the autopsy a hindrance to the passage of the intestinal contents was found at a point where the possibility of compression between the uterus and pelvic brim arose. There was also dilatation of the ureters where they entered the pelvis, so that in this case the gravid uterus must be considered the cause of the obstruction, in his opinion. According to Fleischauer, this case confirmed the opinion of Van der Hoeven,[5] in 1912, that in the 3rd and 4th months of pregnancy an occlusion of bowel is more liable to appear than at any other time, that is to say, at the time the uterus rises beyond the the brim of the pelvis. Der Verf was of the opinion that in the final

analysis the cause of the ileus is to be found in the bowel itself owing to muscle weakness and loss of muscle tone. A second case described by Fleischauer appeared at the 6th month. The obstruction was caused by adhesions from a previous operation — the growing uterus being simply the deciding factor in the cause of the ileus.

In 1913, LePage[1] presented a very comprehensive treatise on the subject but arrived, apparently, at no conclusions. He pointed out, very sensibly, that in any discussion of the proper course to follow *re* treatment of acute obstruction during pregnancy, the patients must be first divided into two classes, as follows:— (1) those without any past history of intestinal or peritoneal trouble; (2) those who have a history of intestinal or peritoneal trouble, with possible operation.

The second group comprises the great majority of cases with intestinal obstruction during pregnancy. Here the pathological residue of former troubles, adhesions or what not, is undoubtedly the primary cause and the gravid uterus, constipation, etc., are quite secondary though, of course, playing the deciding rôle in the tragedy. The object of this paper is to discuss the first group. We wish to try and decide whether the intestinal obstruction of normal pregnancy is a clinical entity, and if so, what is the rational treatment. In other words, the distinction between the groups might well serve as a therapeutic guide. Group 1 is possibly an obstetrical problem. Group 2 is probably primarily a surgical problem. LePage says, "If we can diagnose those exceptional cases in which the presence of a gravid uterus suffices to produce obstruction, even occlusion, in an intestine non-adherent and with no bands, but simply compressed, therapeutics should immediately consist in getting rid of the uterine tumour. This course," he adds, "raises the great question of the right of the fetus to life."

R. Kohler,[7] writing in 1920, says the cases in which a pregnant uterus alone produces the ileus are rare.

Klotz, Cuneo and Pinard[6] in 1913 described:

> An apparently typical case of intestinal obstruction in a "silent abdomen" with a 7½ months' intrauterine pregnancy. Operation by Cuneo was described by him. The cæcum was extremely distended; the rectum and sigmoid empty. There was a tense band on the left flank of the gravid uterus. A cæcostomy was done, with recovery.

The surgeon's findings are of course inconclusive, as Dr. Cuneo felt that the patient's general condition did not warrant prolonged exploration of the apparent band. The case is most suggestive, however, of a place in Group 1.

Abrahamsen[8] in 1925 reports the findings of Fleischauer and of Von Handorn as follows:—

> "A 42 year old woman, 7-para, in the 8th month presenting all the symptoms of an acute obstruction confirmed at laparotomy. The obstruction was found at the recto-sigmoid junction, the point where the large bowel crosses the pelvic brim. It was pinched by the uterus."

He outlined another case in which the occlusion was an ileus, caused by a volvulus, in turn due to pregnancy, in his opinion.

Abrahamsen goes on to give the following case of his own, which, he believes, confirms the opinion of Hornung:

> A 42 year old primipara, at the end of pregnancy, of healthy stock, who had never been seriously ill, arrived at the clinic after a two hour journey by wagon. She stated that the membranes had ruptured eight days previously. When she left home the head was not engaged, the midwife asserted, and there were no signs of intestinal obstruction. On admission she appeared very ill; temperature 37.2° C.; pulse 138. There were hurried breathing, an anxious expression, and cold sweat on forehead. The whole abdomen was tympanitic; everywhere was visible peristalsis; no nausea or vomiting; no pathological resistance felt in abdomen. Pains occurred every ten minutes. Examination showed os dilated to the size of a florin; membranes ruptured. The fetal heart sounds were not heard on account of meteorism. Twice within the next two hours gas was passed. The patient was given camphor, caffeine, physostigmin, and the condition seemed to improve. After some hours the os dilated to the size of a five-mark piece, the pains followed each other every five minutes and lasted fifty seconds. Pulse 126; temperature 38.7°. As the patient suddenly vomited and the general outlook became decidedly worse, the child's head was perforated in the hope that the lessening of the weight by emptying the uterus might avert the threatening symptoms. On admission of the hand, gas came from the uterus together with a foul-smelling amniotic fluid and meconium. The child was extracted without difficulty. At the time of extraction, large amounts of gas were expelled from the bowels. A normal placenta followed spontaneously. Immediately after delivery there was a marked improvement. The patient felt better, breathing was easier, the meteorism was almost gone, there was no vomiting, and gas was expelled now and again. The next day came a sudden change for the worse—acute heart weakness, a hardly perceptible pulse, some meteorism, but no other signs of ileus. Heart stimulants were of no avail. Death occurred from cardiac failure.
>
> Autopsy showed the following: The intestine was full of gas. Dilatation began in the small intestine and ended at the sigmoid flexure. There were no signs of peritonitis. There was a large blood clot in the uterus, etc. Anatomical diagnosis: ileus of entire rectal canal; early endocarditis of the mitral valve; slight enlargement of the spleen and heart. Dr. Stork comments as follows: "This case shows much of interest. It proves that at the end of pregnancy, at the beginning of labour, ileus may occur due solely to the pressure of the uterus on the terminal bowel. As the woman left home to go to the clinic both the midwife and her doctor saw

no signs of obstruction. The membranes were ruptured eight days before. For two days there had been slight pains, and the head was movable above the brim. The patient journeyed in a wagon over bad roads for two hours before she arrived at the clinic, and on her arrival there she appeared very ill. During the journey the pains began to strengthen and the head became fixed, etc. The descending head compressed the bowel at the spot where it enters the pelvis and had led to ileus. The tedious labour of a primipara may have helped to complete the obstruction. It is remarkable that on putting the patient on her right side, within the first hour gas was twice expelled. This fact in conjunction with the history leaves no doubt as to the etiology of the occlusion.

The object of this report is to show that ileus can be due primarily to a gravid uterus, that the danger is greater when due to increasing severity of the pains, the child's head compresses the bowel in the small pelvis and that damage to the bowel from the puerperal uterus is also to be considered."

We believe that we bring the literature up to date with the paper by M. E. Bohler[11] before the Société d'Obstétrique et de Gynécologie de Strasburg on June 14, 1930. He presents two cases. The first case belongs in Group 2 and will not be considered here. Case 2, Bohler believes, is a "true ileus of pregnancy, a variety of occlusion extremely rare. In fact the literature up to 1926 cites only twelve cases." This case belongs, we agree, in Group 1 and is here recorded:—

A 5-para whose pregnancy developed normally till within three weeks of term. At the first pains the patient entered hospital. But these infrequent pains ceased after a few hours. The head was engaged. The neck of the uterus remained closed. True labour pains commenced four days later. Toward the end of labour, meteorism developed, not at first alarming, as the action of the bowels appeared normal. The next day meteorism increased. Towards mid-day the patient began to complain of intense and persisting nausea. Gas ceased since morning and it was impossible to obtain a bowel movement. Towards evening the patient commenced to vomit. In the night the general condition became visibly altered and the vomitus was fœtid. Interference on account of occlusion of unknown origin was undertaken in the course of the night. On incision of the abdominal wall, distended loops of intestine appeared in front of the uterus. The uterus was emptied by Cæsarean section. At the time of delivery of the uterus it was observed that the sigmoid, much distended was compressed by the uterus at the entrance of the small pelvis and that the intrapelvic portion and the rectum were collapsed. The colon and small intestine were uniformly much dilated. After interference, a massive intestinal evacuation was obtained. The general condition rapidly improved. Post-operative and post-partum results were normal. The child is living.

Later in his paper M. Bohler makes the following statement, "There exists, however, a particular variety (of ileus) during pregnancy due to the compression of the sigmoid of the bowel at the crossing of the innominate line. This variety is very rare—up to the moment but twelve cases only are known.

The extraordinary lack of discussion in our language of this interesting, if rare, entity naturally makes one reticent in the matter. It may even be fair to assume that the English speaking profession does not accept normal intrauterine pregnancy as a cause of intestinal obstruction. Leonard,[12] in 1917, described a case obviously belonging in Group 2 and summarizes by saying, "Normal intra-abdominal pregnancy rarely, if ever, causes acute obstruction *per se.*" They prefer to waive the whole thing as did the great French master Pinard thirty years ago. My own opinion is that the matter cannot be so readily disposed of.

The raison-d'être for this study was a case which came under my direction in August, 1931. The history follows:—

Mrs. T. McC., aged 30, primipara, was admitted to the Surgical Department of the Vancouver General Hospital on August 2, 1931, suffering from abdominal pain. She stated she had always suffered more or less from constipation, that she had menstruated last on January 1, 1931, and was now some seven months pregnant. She carried her baby comfortably and her constipation was, she thought, no more marked during pregnancy than before. She had always been in the habit of taking pills or powders at irregular intervals when the bowels became sluggish. She had never at any time been entirely dependent on drugs for her bowel elimination. She had a natural bowel movement on the morning of July 29, 1931. On July 30th she took about ½ ounce of castor oil and some hours later (mid-day) had a large bowel movement. During the night she began to have distension of the abdomen with accompanying cramp-like pains in the abdomen and back. She stated that she vomited only when she took medication, either analgesic or laxative. July 31st, August 1st, August 2nd, her discomfort steadily increased. Distension reached an alarming degree; good deal of pain, no bowel movement or gas could be eliminated either by medication or enema for 84 hours prior to admission. She ate almost nothing for the three days before admission but she stated that what she did eat she kept down. Her vomiting was limited to her medication only. She was admitted to Vancouver General Hospital at 11.30 p.m. on August 2nd.

The patient was large-framed and apparently physically sound, except for a tremendously enlarged abdomen. Temperature 99°; pulse 94; respirations 24; blood pressure 140/90. Urinalysis was quite negative.

When seen by the Obstetrical Department, nothing could be made out regarding her pregnancy. Her history and statement that she felt life quite occasionally left little doubt as to the diagnosis of pregnancy, but no uterine outline, nor fetal heart, could be found. Her distension was enormous, the abdominal skin being stretched and shining, as a drum. Percussion showed marked tympany everywhere over the abdomen. Patient complained of sharp knife-like pains every 15 minutes, so a vaginal examination was made, but the cervix was found far back in vaginal vault, long and closed. There was probably no labour.

The patient was given several double 1-2-3 enemas, with eserine and also with pituitrin, with almost no result. During the evening of August 3rd she was given 75 c.c. of 20 per cent salt solution intravenously without result; only a small amount of mucus was reported expelled. At 1.30 a.m., August 4th, a laparotomy was performed by a staff surgeon, (Dr. G. E. Gillies). A

large 7 months' intrauterine gestation was found filling a large part of the abdomen. The entire bowel was markedly distended, so distended in fact that it was found necessary to puncture it in three places in order to make an examination. The sigmoid was then found to be pinched off at the point where it crossed the pelvic brim. Below the point of constriction the bowel looked empty and collapsed. It seemed apparent to the surgeon that the cause of the constriction was the overlying gravid uterus. On straightening out the sigmoid, gas was felt to pass over the pelvic brim into the rectum. A rectal tube was inserted in the rectum and passed beyond the point of constriction. Gas passed apparently freely into the tube.

Although Doctor Gillies felt that the gravid uterus was the direct cause of the constriction, he did not empty the uterus. He hoped that the rectal tube would relieve the situation.

The day of the operation, the distension was seemingly unchanged and the patient was still very uncomfortable. Transfer to the Obstetrical Department for the purpose of emptying the uterus at once was then advised. A medical induction with pituitrin was attempted during the day of August 4th without success. At 9.50 p.m. the membranes were ruptured through a cervix still closed. Patient thought that she felt better.

On August 5th, the patient was voiding sufficient urine, took a little water and a little orange juice without vomiting. A soap suds enema through the rectal tube still in place produced a little gas and an occasional fleck of fæces. There were some irregular pains, apparently labour pains; during the day.

On August 6th, the pains were more severe, not expelling any flatus; the patient very uncomfortable; distension very marked; abdomen enormous. Vaginal examination, made at 10 a.m. showed dilatation complete. A live baby was delivered with mid-forceps, weighing 1,945 grams. Following labour pituitrin, min. iv, was given every hour for six doses. Flatus passed and the patient felt more comfortable.

On August 7th, the patient was decidedly more comfortable. At 2 p.m. she had a large bowel movement, expelling the rectal tube and was greatly relieved. The patient went on to an uneventful recovery and was discharged with her baby, well, on August 23rd.

The patient had never had any serious illnesses, no complaints relative to her abdomen except moderate constipation. Her abdomen had never been opened. The case belongs, then, in Group 1 in my opinion, if these cases are as rare in literature as Bohler states, then it may be permissible to consider his case as already described to be number 13 and our own as number 14.

In consideration of the etiology both French and German writers cast about for a probable cause for this occasional unfortunate accident. Of course, if the picture of any pregnancy were put before an inexperienced layman, his only wonder might be that any near term pregnancy could escape bowel obstruction. He might possibly even be tempted to criticize Providence in his ignorance of the general internal arrangement. The advisability of having the sigmoid pass over the brim of the pelvis at all is surely debatable. Yet the pinching off of the bowel at this point is, no doubt, one of the very rarest of all obstetrical accidents. No doubt the promontory of the sacrum is the saving grace of the situation in practically all cases. Of all the explanations put forth by European writers that we have seen, that of weakness of the muscle tissue in the bowel wall, with loss of muscle tone, is, perhaps, the one most worthy of consideration. The condition can apparently arise at any time after the gravid uterus has become an abdominal tumour.

TREATMENT

The repeated suggestion by continental writers of 1900-1910 that colostomy, very often appendicostomy, be performed will be considered as rather heroic by obstetricians in this country, I think. The question of the "Right of the child to live" as the French put it, is of course very real. It is fortunate that the condition is very rare, and when it does occur I think that the majority of babies will have reached the age of viability, as in our own case.

It would seem sane to suggest, then, that when intestinal obstruction intervenes in the course of normal intrauterine pregnancy, the abdomen be opened and the cause, if at all possible, be ascertained. If the case belong in Group 2 the condition should be dealt with and remedied, ignoring the pregnancy. If it belong in Group 1 it would, in my opinion, be wise to empty the uterus at once by hysterotomy.

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THE TREATMENT OF DISTENSION FOLLOWING ABDOMINAL OPERATIONS IN CHILDREN*

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ONE of the troublesome complications following abdominal operations is distension. In the past the measures to deal with it have been chiefly the local application of heat, enemata, and various drugs, of which the most useful have been eserine and pituitary extract. In our experience these methods have been disturbing to the patient, and uncertain in their results. In a series of 10 cases of appendicitis in which distension was a feature we have replaced the ordinary methods of treatment by diathermy. We have noted no untoward effects, and, although the cases are too few to draw any definite conclusions, we believe that all the patients were benefited by its use. In a survey of the literature no mention of the use of diathermy in this type of trouble has been found.

Distension may, of course, vary in degree from a slight flatulence to the most severe form of toxic ileus. In the presence of the latter, the toxæmia, which, according to the experimental studies of McVicar and Weir,[1] is associated with high blood urea, increased alkalinity of the blood and a decrease in the chlorides of the blood, may be overcome by the intravenous administration of a sodium chloride-dextrose solution, consisting of 10 grm. of sodium chloride and 100 grm. of dextrose to a litre of water. By the use of this solution the blood chlorides are replenished, intestinal peristalsis is increased, and diuresis may be produced. In our cases this procedure was unnecessary, as diathermy appeared to overcome any tendency to intestinal motor disharmony before this stage was reached.

To stir up peristalsis while peritonitis is still active would be the height of folly. On this account we have refrained from using diathermy before the third post-operative day. In a personal communication from Dr. J. F. Weir, of the Mayo Clinic, he states that he holds the same opinion in regard to the use of the saline-glucose solution. By using diathermy after the third day leucocytosis also is stimulated, and in the case of a ruptured appendix the pus appears to become localized and thicker much more quickly than in the untreated case.

The technique employed consisted in placing an abdominal plate on the skin in close proximity to the wound, while a back plate was placed over the lumbar vertebræ. The abdominal plate was about two-thirds the size of the back plate, in order that the heat might be focussed on the intestinal mass. The size of the plates varied with the size of the patient. In the case of the four-year old child, whose history will be given later, the abdominal plate measured 3 by 4 inches and the back plate 4 by 6 inches. The treatment commenced with a dosage of 250 milliampères for 10 minutes. This was used twice a day for three days, the dosage gradually being increased to 750 milliampères for 20 minutes on the third day.

The following case history illustrates the action of diathermy. This is the first case in our series in which this treatment was used. The child was more acutely ill than any other child so treated.

B. H., a male, aged 4, was admitted to the Children's Memorial Hospital, London, on the eve of September 15, 1930, complaining of vomiting, abdominal pain and localized tenderness over the lower right quadrant. His temperature was 101° F.; pulse 120; and leucocyte count 8,200 per c.mm. The following morning the leucocyte count was 16,450. A diagnosis of a ruptured appendix was made. On opening the abdomen a considerable amount of cloudy fluid was obtained. The intestines were injected and there were no indications of localization of the lesion. A drain was inserted but no attempt made to remove the appendix. The temperature after the operation was 104° F., pulse 140, and respirations 40 per minute. After the operation he vomited at intervals of two to three hours. Distension became quite marked and at the end of the second day this was extremely troublesome. Several small liquid stools had been passed and some flatus expelled. Neither the infra-red lamp nor the electric pad gave any relief. The rectal tube was used frequently. On the third day the boy became comatose, appeared to be going downhill rapidly, and vomited fæcal material. The pulse was of poor quality and he appeared to be *in extremis*. On the suggestion of Dr. Ernest L. Williams we decided to use diathermy on the abdomen. Plates were adjusted at 4.30 p.m. and 9.30

* Read at the ninth annual meeting of the Canadian Society for the Study of Diseases of Children, Lucerne-in-Quebec, June 5, 1931.

p.m. During the night several large liquid stools were passed and flatus expelled freely. After each treatment he slept naturally for an hour or more. In the morning his condition was much better. The distension had become negligible. The pulse was slower and of much better quality. Slight vomiting continued at intervals. This ceased within 24 hours. His later progress was uneventful.

SUMMARY

By the use of diathermy troublesome distention following abdominal operations may be controlled. This procedure is most useful in those cases in which, following rupture of the appendix, the distention and toxic state become pronounced and dangerous. There is no difficulty in its management. It causes the patient no physical or mental discomfort, even acting as a soporific. It can be used as often as is necessary, and adds no extra burden to the circulatory system, as may be the case where hypodermic medication is used.

In those cases where toxicity is marked a saline-glucose solution intravenously may be of assistance in overcoming the toxæmia and increasing peristalsis.

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INTRACAPSULAR FRACTURES OF THE NECK OF THE FEMUR*

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INTRACAPSULAR fractures of the neck of the femur are of especial interest to the clinician because, in spite of the great attention that has been given to their treatment, delayed and non-union and poor functional results have been more frequent than with almost any other fracture. The reasons for this have been poorly understood. Since the time of Sir Astley Cooper they have been usually attributed to interference with the blood supply of the fragments, particularly the proximal one.

There has been neglect to study the pathology of these fractures, both recent and old, united and ununited, and in the utilization of that knowledge in the x-ray diagnosis and treatment of the various forms. Axhausen, Schmorl and Nussbaum were the first to study in detail the microscopic changes in the head and to note their bearing on healing and functional results, but their cases were few and the information derived from them is fragmentary. Attention has been given to this subject in the Department of Surgery of the University of Chicago, and last year Santos published the results of a study of a selected group of cases. As a result of these studies information of both practical and theoretical nature has been acquired.

To summarize, we may say that after intracapsular fracture of the neck of the femur the proximal fragment, which consists largely of head, may remain alive, receiving its nourishment through the internal portion of the capsule or round ligament, or may die from interruption of the circulation. The percentage of cases in which it becomes necrotic is not definitely known, because of lack of studies on material derived from autopsy and operation and because of failure to utilize the x-ray in the recognition of necrotic heads. However, we know that it dies in a considerable percentage of cases. In either event the fracture may unite or remain ununited, so that we have one of four conditions with which to deal:—(1) a live head with union; (2) a live head with non-union; (3) a dead head with union; (4) a dead head with non-union. As a result of the utilization of our knowledge of the pathology of these cases in x-ray interpretation it is usually possible to say after the lapse of several weeks from a study of roentgenograms whether the head has died or remained alive. It has been found that there is more or less creeping substitution of the dead bone by new bone. In the act of replacement of the dead head by living bone in the cases where non-union has resulted new bone is formed from the invading connective tissue by metaplasia of the fibrous into bony elements. This change is similar to that observed by Dr. Gallie in the replacement of the dead bone of transplants by living bone. The x-ray determination of whether the head is alive or necrotic is based on the difference in density changes in the two conditions. If the head remains alive it shows a reduction in density as a result of atrophy of disuse during the

*From the Department of Surgery of the University of Chicago.

Read at the Toronto Academy of Medicine, November 3, 1931.

period of treatment, and subsequently, if function is not restored to normal. If the head dies it of course cannot undergo atrophy of disuse and density changes result only from bony absorption by invading connective tissue and replacement by new bone. Absorptive and reconstructive changes in the necrotic head usually come about much more slowly and unevenly than is the case of atrophy of the living head. Consequently, in most cases it is possible to determine from x-rays taken after three months have elapsed whether the head has died or remains alive.

When the head is alive and union occurs the bones of the region, including proximal and distal fragments of the femur and the os innominatum, undergo atrophy of disuse during the period of healing and the reduction in density is no greater in the head than in the distal fragment. With resumption of use the density is gradually restored to all of the bone of the region. Uniformity of density of proximal and distal fragments after a prolonged disuse is good evidence in favour of a living head.

When the head remains alive and non-union results the neck fragments on both sides of the fracture line are gradually eroded. The density of head and distal fragments is gradually and uniformly reduced. The head retains its form and the articular cartilage, being alive, retains its normal width. A considerable degree of atrophy usually persists inasmuch as function is not restored to normal. However, after years of fibrous union and extensive use, the head may regain most of its original density.

In case of necrosis of the head followed by non-union the period of disuse is usually marked and prolonged, and atrophy of the innominate bone and distal fragment is usually well developed after three months. The dead head is gradually invaded by vascularized connective tissue replacing the dead marrow. The invasion occurs both by way of the round ligament which hypertrophies and through untorn portions of capsule or adhesions which form between the eroded fracture surface and capsule or between the articular cartilages. After several months have elapsed, absorption of the dead bone usually begins, with partial replacement by new bone which forms from metaplasia of the invading connective tissue. This usually means that the dead head casts practically a normal shadow for at least several months and can usually be recognized in roentgenograms during the period after atrophy has been established in the surrounding living bone. When absorption of the dead bone and creeping substitution by new bone are well under way the necrotic head also decreases in density, but the absorption and replacement are usually so irregular and uneven in distribution that the x-ray appearance of cavitation is created and the condition of transformed necrotic head can be diagnosed from roentgenograms.

There may be death of the head in cases in which bony union of the fracture takes place. This is especially true if the fracture is impacted, but it may also occur in case of good reduction and fixation by the reduction abduction cast. After two or three months the dead head may cast a heavier shadow than the surrounding living bone, making it possible in this way to recognize the presence of the necrosis. However, invasion of the necrotic area by blood vessels and connective tissue, coming by way of the round ligament and across the healed fracture site, usually leads to a gradual irregular reduction in density of the head with replacement by new bone. The latter is usually irregularly arranged and small in amount in some regions, giving the appearance of cavitation in roentgenograms. If weight is put on the extremity before the dead head has been invaded and replaced by new bone there may be breaking down and caving in of the weight-bearing portion of the head, which produces a characteristic deformity as shown by the cases reported from the University of Chicago Clinics by Santos[1]. In case of recognition of necrosis of the head with bony union the patient should be kept on crutches for at least a year, to prevent collapse of the head while it is undergoing replacement by new bone.

In traumatic dislocation of the hip, with tearing of the round ligament, the blood supply to a large portion of the head may be cut off, and aseptic necrosis with subsequent breaking down of the weight-bearing portion from walking may be brought about. I have seen two cases of this kind in adults. They prove that the old teaching about the absence of blood supply for the head of the femur by way of the round ligament does not hold for all cases.

The bearing of necrosis in the head of the femur following intracapsular fracture on treatment is obvious. There is much greater likelihood of non-union than is the case when the head survives, and attempts to obtain bony union by operative procedures in the late cases offer less promise of success. In general, I feel that all fresh intracapsular fractures of the neck of the

femur that can be well reduced under anæsthesia are best treated by some form of abduction fixation apparatus, my preference being for the Whitman cast. If union is not firm at the end of three months, further fixation is indicated, and consolidation of the fracture may be obtained only after six or more months of immobilization. The recent results reported by Smith Peterson from nail-fixation are so encouraging that his form of treatment may replace non-operative treatment to a considerable extent. If the patient is seen after non-union is established the treatment may vary according to whether the head is dead or alive. If the x-ray indicates that it is alive an open operation may be performed, with freshening of the fracture surfaces and fixation, either by an autogenous bone peg or Smith Peterson nail. On the other hand, if the indications are that the head is dead it now appears that the best procedure is to remove it and perform a Whitman reconstruction operation.

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THE USE OF IODIZED OIL BY THE SANATORIUM PHYSICIAN IN THE DIAGNOSIS OF BRONCHIAL AFFECTIONS*

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IN the diagnosis of pulmonary affections the sanatorium physician has many problems to solve. Visualization of the bronchial tree with some opaque substance such as iodized oil has been a great help, and many doubtful cases have been definitely tabulated. Sicard and Forestier first employed iodized oil in 1921 as an aid in locating and demonstrating obstruction of the spinal canal and later it was used successfully by the originators in exploring dilatations, fistulous tracts, and cavities of the bronchial tree. Later still, Sargent, Cottenot, Nigoul-Foussal, Ballon, Archibald, and others became interested in this diagnostic aid.

In 1924 the writer[1] first employed iodized oil in the form of bronchial injections as a diagnostic agent. The iodized oil (lipiodol), which we have used continuously, is a chemical compound of forty per cent iodine and oil of poppy seed, described and used by Forestier. The oil and iodine are so closely combined that the ordinary starch test fails to show evidence of free iodine. Iodized oil is of clear amber colour, is neutral in reaction, has a specific gravity of 1.350, and is insoluble in water or alcohol. The iodine may be liberated by the alkaline carbonates of the saliva and intestinal secretions, but is not affected by the gastric acid. It becomes brown when exposed to the action of light, air, moisture, and high temperature because of the liberation of iodine, and when found in this condition should not be used. The high iodine content of the compound renders it opaque to the Roentgen rays. The value of the oil as a diagnostic agent is due to its resistance to the x-ray and to its tolerance by the bronchial mucous membrane. The therapeutic advantages are due to the slow rate of absorption of the combined iodine without harmful effect on the patient. Iodism does not occur unless the oil is swallowed and subjected to the action of the intestinal secretions. The slow liberation of iodine prevents the danger of pulmonary congestion, which sometimes follows the use of iodides.

There are four methods of introducing iodized oil into the bronchial tree; namely, the supraglottic, the transglottic, the subglottic and the bronchoscopic. In the subglottic method a hollow curved needle is passed through the cricothyroid membrane into the trachea, while in the fourth the oil is introduced through the bronchoscope.

The following general principles should be observed in all methods. (1) The use of discoloured oil should be avoided. (2) Warm oil should be used, as it flows more freely and lessens the tendency toward cough. (3) X-ray exposures should be made as soon after injection as possible, and cough should be prevented by restraining unnecessary movements of the patient.

The sanatorium physician will find the supraglottic method the most satisfactory in the great majority of adult cases, for the following reasons.

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The method does not require the services of a trained specialist, and the technique can readily be acquired by the internist, the general practitioner, or radiologist. The method is less complicated, time-saving, and causes the patient less strain and worry. Little or no inconvenience is experienced by the patient after the injection. In over six years' experience with this method no ill effects have occurred. The method may be employed in the fluoroscopic room, office, or hospital, with less inconvenience to patient and physician. Any part of the bronchial tree may be visualized by this method.

The disadvantages of the supraglottic method are the following. It is not very satisfactory when attempted in children. In cases of lung abscess or other pulmonary lesions with destructive changes or cavity formation, the oil does not penetrate by gravitation, as compared with the excellent results obtained by bronchoscopy.

TECHNIQUE

From 1910 to 1913 the writer used the supraglottic method in administering intratracheal injections of one-half of one per cent menthol dissolved in a hydrocarbon, for the purpose of emptying bronchiectatic cavities. The patients were placed in the recumbent position and no anæsthetic or laryngeal mirror was used. In 1924 this same method was employed with lipiodol, except that in many cases a local anæsthetic was used and the patient was placed in a sitting position. However, it was soon found that the original technique of 1910 was preferable. It is possible, when a local anæsthetic is used in the pharynx or larynx, that some spastic reaction occurs lower in the bronchial tree, on account of the fact that a more extensive and satisfactory visualization appears to occur when no anæsthetic is used.

No laryngeal mirror is necessary. The fewer instruments used in the mouth the better. A head mirror is helpful, but not essential. In our experience the syringe used should be all metal, 30 c.c., with two rings attached to the end of the barrel and one on the piston. An all metal flexible cannula of large calibre, almost six inches long, slightly bent at the extremity, is most satisfactory. With this type of syringe one has the advantage of heating the oil in the syringe by placing the latter under the hot-water tap. Fifteen c.c. of oil will just half fill the syringe, so that the rings are not far apart and easy to manipulate when the cannula is held in position. The cannula should not touch any part of the tongue or pharynx.

The patient should be placed in a recumbent position on a tilting table, lying on the side to be injected. Two pillows are placed under the lower shoulder and three used to elevate the head. This places him in a semi-recumbent position. The tongue is protruded and caught in a cheesecloth handkerchief, being held in this position by the patient using the lower hand.

Use much psychic anæsthesia, by stating what you intend doing. Explain carefully that no operation is to be performed, no pain caused, and instruct the patient that he must refrain from coughing or swallowing. Complete relaxation is necessary, and to ascertain if the patient is relaxed note the position of the tongue when it is extended. A high longitudinally arched tongue means tension on the part of the patient and that little or no success will be the result. The back of the tongue must be relaxed and flattened out before proceeding with the injection. The slightly bent end of the cannula is placed over the back of the tongue a little towards the side opposite the pillow. The patient is asked to breathe deeply and quickly. The oil is allowed to flow continually. The whole time of pouring should not take more than two minutes. The patient is then asked to take a few deep breaths. In this way a more extensive visualization may be obtained. If the middle or upper portions need investigating, level the patient immediately after the injection and tilt the chest and head downwards for about half a minute The following suggestions may prove helpful. The oil should be warmed, which will facilitate flowing and cause less reflex action. The x-ray machine should be nearby. A fluoroscopic study should be made after stereoscopic films are made, as time is a factor. On fluoroscopic study, note if any oil was swallowed. If so, give hot water and soda (emetic). Do not let the oil reach the intestines.

An oblique or lateral chest film should be made in all cases, as the postero-anterior chest stereoscopic study does not show all the involvement in the majority of cases of bronchiectasis. Frequently more extensive dilatations are found by an oblique or lateral study.

The method is valuable in cases of long-standing bronchitis with little or no expectoration and indefinite etiology; in cases of chronic cough with

purulent expectoration and little or no x-ray abnormality; in cases of chronic cough with a previous history of pneumonia or foreign body; in cases of bronchiectasis for the purpose of mapping out the dilatations.

In 1926 the following exceptions to the use of iodized oil in bronchial visualization were suggested by us[2], and now, after a much greater experience, it is felt that there is nothing to add or omit. (1) Acute respiratory affections such as rhinitis, pharyngitis, bronchitis; (2) in cases of acute or active tuberculosis; (3) very extensive and advanced pulmonary suppurations, particularly when the patient is extremely weak; (4) advanced circulatory complications, such as angina pectoris, aneurysm, and cardiac decompensation; (5) recent hæmoptysis.

CONCLUSIONS

All methods of visualizing the bronchial tree are worthy of consideration and appreciation; all have their specific advantages. The supraglottic method is perhaps the most uncomplicated, simple, and time-saving for the sanatorium physician, the general practitioner, and the radiologist to consider.

In the differential diagnosis of a foreign body, malignancy, and the visualizing of lung abscess, the bronchoscopic method is of much greater value.

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X-RAY DIAGNOSIS OF THE GENITO-URINARY TRACT*

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XV

THE discovery of x-rays by Roentgen and the subsequent studies by other workers in the use of these rays have played a most important part in the development of urology. As stated by Young and Waters,[1] there are no two branches of medicine more closely associated and more interdependent than urology and roentgenology. In this paper I have decided to devote my whole time to refreshing your memories as to the various methods of employing x-ray examination in urological diagnosis. In some cases the entire diagnosis is made from the x-ray findings, while in many others the information so obtained, when correlated with the history, and other findings, assists in the final diagnosis. The maximum information from x-ray examinations is best obtained by the close cooperation of the urologist and the roentgenologist. I quite agree that as regards the appreciation and evaluation of the x-ray findings in the genito-urinary tract, the urologist will be quite as accurate as, and, in some cases perhaps more so than, the roentgenologist. On the other hand, the latter is more observant of and trained to consider other shadows and findings outside the genito-urinary tract, which may have a very definite influence on the diagnosis.

In considering the various methods in use at the present time, I may say that these may be employed for the entire tract, or applied to each individual part. The methods may be considered under two headings:— (a) direct; (b) indirect. In either method, we may employ the fluoroscope, x-ray plates, or both.

First let us consider the direct method. By this I mean examination entirely confined to the genito-urinary tract. This is carried out by first taking plain plates of the entire tract. I feel this is most important, but unfortunately it is often omitted. Very frequently all that is required for diagnosis is obtained from this simple procedure. For example, if one discovers a large vesical calculus, and the patient's symptoms are entirely explained by its presence, further examination may be unnecessary, and proper treatment may be at once instituted. It also provides information to the urologist which will have an influence on his

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This is the fifteenth in the series of articles on physio-therapy published in the *Canad. M. Ass. J.* The preceding papers will be found in 1931, **24**: 263, 409, 539, 679, 831; and **25**: 65, 164, 311, 444, 582, 702; 1932, **26**: 62, 195, and 308.

subsequent examinations. If the shadows indicate a large renal calculus he will most likely not attempt to inject so great an amount of opaque fluid as he otherwise might have done. If a shadow is seen in the area usually occupied by a ureter, which suggests a possible calculus, he is perhaps more attentive when nearing this area with a catheter, for evidence of partial obstruction or stone. If the bones of the pelvis and vertebræ show changes suggesting metastases, he naturally considers the prostate. Or if numerous dense shadows are seen in the prostatic area, which most likely indicate calculi in the prostate, it may explain findings which had suggested malignancy during a previous digital examination of the prostate. Also, occasionally, we see shadows in the pelvic plate which have the density of bone, but which are the result of injections in anti-syphilitic treatment.

In the flat plate examination, not only should antero-posterior plates be taken but lateral plates also are very necessary. By taking the latter, one is very often able to make a differential diagnosis of shadows which occupy the kidney and ureter areas, and this is especially true of the right upper quadrant. Here we have to remember that the gall bladder occupies much the same area as the kidney and that gall-stone shadows often simulate renal calculi, and vice versa. In a lateral plate the kidney area is in the same plane as the bodies of the vertebræ, whereas the gall bladder is well anterior to this. The same procedure will be very helpful in differentiating between calcified glands and renal or ureteral calculi. The next step is the study of plates taken after the tract has been outlined by retrograde filling with an opaque solution or by the intravenous injection of a solution of, under the names of uroselectan, skiodan, etc. one of the iodine derivatives now on the market Of the two methods of filling, the retrograde is the older, of which we have, to date, the greater knowledge, and is the more accurate. This does not mean that the intravenous route is without value. On the contrary, in some cases it is of more assistance than the retrograde, but, I think it is agreed that so far it must be considered as supplementary to, and not as a method supplanting, retrograde filling. Its greatest value will be in those cases in which cystoscopy and ureteral catheterization are impossible, and especially so in children. It is often an assistance in the diagnosis of anomalies. It may be used as a functional test, which is comparatively accurate.[2] Its greatest weakness is in its failure to accurately outline minor deformities. The plates necessary for a complete study of the tract after retrograde filling are plates taken in the prone position, plates with the patient erect, plates with catheters partially withdrawn, and sometimes a fourth plate with the catheters completely withdrawn. From a study of all of these, information is obtained of the size, shape and position of the calices, pelves, ureters, and bladder, and from this we arrive at our conclusions.

The position of the kidneys will be seen, and the degree of movement of one or both determined by comparison of the plates taken in the prone and erect positions, and also an ectopic kidney may be discovered. Anomalies such as bifid or supernumerary kidneys or horseshoe kidneys also may be discovered. Deformities of the pelvis and calices will indicate the probable pathological condition present. For example, blunted calices and dilated pelvis, if unilateral, point to obstruction above the bladder, and, if bilateral, obstruction in or below the bladder. If a calyx is ragged and irregular we suspect early tuberculosis, while if several such are seen with irregular dilatation of the ureter the disease is probably advanced. If the pelvis and calices are thinned and stretched out, one at once thinks of tumour, and, if bilateral, the diagnosis of polycystic kidneys is to be considered. If the catheter passes part way up the ureter, and the solution passes beyond, and the ureter when near the pelvis makes a definite angulation, the question of an aberrant vessel must be ruled out. On the other hand if no solution passes beyond the tip we have evidence of a complete obstruction, and if this corresponds to a shadow seen in preliminary plates we know it has been caused by a calculus.

The examination of the bladder is best carried out by a separate examination, in which the bladder is filled either with an opaque fluid, or air, the former being the most common medium. In this examination two plates are usually taken, the first with the bladder filled, and the second after drainage. Stereoscopic plates are often indicated, as well as plates with the patient

standing. In the study of the shadows so obtained one must carefully consider every change in outline, and position. First of all, one must not be misled by changes in shape produced by pressure from a cystoscope or catheter which has been introduced so far as to press unduly on the superior portion of the bladder, and so produce a deformity. The size and shape is noted, as to whether it is unduly small, or dilated. Also note irregularities in shape, such as may be produced by pressure from without, for example, by an enlarged prostate. Also observe whether or not there are irregular dilatations and sacculations, such as are seen in cases of diverticula, and here I may point out that the drainage plate often furnishes the maximum data. The presence of growths in the wall itself will be seen as irregular displacement of the opaque media; also note whether or not there has been a reflux flow up the ureters. In gynæcological cases plates taken in the prone and erect positions are often of value in determining the degree of cystocele present.

The seminal vesicles may be examined after injection with an opaque solution. Fluoroscopic examinations are sometimes made of a kidney during operation in order to determine the site of calculi or whether all calculi have been removed.

By the indirect method, I mean that by which information may be obtained by examinations of other parts of the body, and from which we obtain indirect evidence regarding conditions arising in or along the genito-urinary tract. The examinations commonly used are the gastrointestinal investigations, both with the barium meal and also the barium enema, examination of the chest, spinal examinations, and examinations of the osseous system. With the gastrointestinal examination we can often obtain evidence of the extent of a kidney enlargement by the degree of pressure on the stomach, small and large bowel, as would be shown by displacement. The same is true in large bladder tumours, as would be seen in sigmoid displacements, as shown in enema examinations. Gall-bladder examinations after administration of iodeikon also may provide additional information regarding the right kidney area. When tumour of the kidney is suspected it is of great value to know whether or not there is metastatic involvement of the lungs. The same may also be said of the osseous system. Also the presence or absence of fractures of the pelvis and vertebræ must be determined in cases of severe traumatism to any part of the genito-urinary tract.

In conclusion one must remember that, while x-ray examinations are very necessary and important in urological diagnosis, the final diagnosis in most cases is not made by this method alone but by a careful coordination of the history, symptoms, laboratory, cystoscopic and x-ray findings.

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STAPHYLOCOCCUS FOOD POISONING.—Edwin O. Jordan has noted that the staphylococcus type of food poisoning differs in several respects from the more familiar type due to members of the Salmonella or paratyphoid group. There is a distinct difference in the incubation period. Staphylococcus food poisoning usually develops within a few hours after the toxic substance is swallowed. In the outbreaks thus far traced to this source, nearly all the persons affected have manifested symptoms within four hours, although rarely symptoms have appeared later. Human volunteers, of whom the author now has a record of approximately 100, almost invariably show the first objective symptoms in from two to four hours after swallowing toxic staphylococcus filtrates. Vomiting appears with considerable regularity about three hours after the feeding. No deaths have yet been observed from food poisoning of the staphylococcus type. In the four outbreaks definitely traced, twenty persons are known to have been acutely ill, without any fatalities. The same is true of the instances reported by Barber and by Ramsey and Tracy, living staphylococci as well as their products being swallowed in these cases. In four additional outbreaks summarized in which there is strong evidence that staphylococci were the inciting agents, 206 persons were affected, without a death. Approximately 100 human volunteers who have become ill after swallowing sterile toxic filtrates have all recovered completely. The symptoms are, however, in some cases alarmingly violent and accompanied by great prostration. The author does not believe that it can yet be said that this form of food poisoning is without danger to life.—*J. Am. M. Ass.*, 1931, **97**: 1704.

THE CLASSIFICATION OF RÂLES

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THE correct interpretation of râles is a great help in the examination of the lungs. Physicians should be familiar with the different varieties and with their probable interpretation; the lung specialist should be particularly expert in regard to them. He should be able to tell with fair certainty from the character of the râles, together with the other methods of investigation, whether a tuberculous patient needs treatment, and what the form of treatment should be; if bed-rest be required, whether this should be continued for a long or short period; if reclining-chair treatment be used, whether exercise can be safely added to it. An accurate knowledge of râles is therefore essential to the correct employment of the rest and exercise treatment of pulmonary tuberculosis.

Râles are sounds produced in the bronchial tubes or air spaces of the lungs by the movement of air in the presence of liquid, or by the separation of moist surfaces. The word "râle" is French and denotes a rattle. It was originally applied to tracheal râles, the death rattle, or other sounds heard by the bystander. A râle is not normal, but is an adventitious sound, usually of morbid origin, accompanying the normal respiratory sound. By an adventitious sound we mean one which is accidental, additional, or foreign to the normal lung sounds.

The word "rhonchus" (Latin, a snoring, or croaking) is used to describe an adventitious whistling or snoring sound heard on auscultation of the chest when the air passages are partially obstructed. "Rhonchus" is sometimes used as equivalent to "râle" in its widest sense. A "rhonchus", however, is properly the coarse bubbling or rattling râle of the large bronchi or of the trachea. "Rhonchus" and "râle" should not be used synonymously, as the word "rhonchus", as thus defined, indicates with one word a class of râles which otherwise would require several adjectives for their description.

In English we have three words which to some extent are used interchangeably to express the same sounds, *viz.*, rhonchus, rattle and râle. "Rhonchus" was the only name used by Laennec; "rattle" was used by a few English physicians; "râle" is now almost universally used by both English and French. When we speak of a *gurgling* or *bubbling râle* we refer to the râle in large bronchi or cavities in the presence of much fluid, and when this râle is not a sign of oncoming death or of deep anæsthesia it is most often heard in patients with advanced tuberculosis. Since such râles depend upon changeable relations of mucus and bronchial tubes or cavities, they are transient, and are easily caused to disappear by cough. The vibrations of the coarser gurgles are sometimes so strong that they can be detected by palpation.

Laennec employed the word "rhonchus" to express all the sounds, except those of health, which the act of respiration gives rise to by the passage of air through fluids in the bronchi or lungs, or by its transmission through any of the air passages partially contracted. Râles likewise accompany cough, and are made even more perceptible by it. They are extremely various, and, although they possess, in general, very striking characters, it is difficult to describe them.

THE ORIGIN OF RÂLES

Râles, therefore, originate in the vibration of exudate in the respiratory passages. The exudate acts like a reed in a wind instrument. The râle is caused principally from the fact that fluid is put in motion by air and is formed into bubbles, which when they burst produce an explosive sound. They originate also when folds of mucous membrane or masses of mucus are set in motion; also through the separation of adhering mucous membrane; also in some cases in the separation of moist surfaces by the entrance of air, as with atelectatic râles. Rapid displacement of the air column in the respiratory passages is particularly prone to induce râles. Many of the sounds are heard only with deep quick breathing or with coughing, or after mucous masses have been displaced after coughing, which is then followed by deep breathing. *It is particularly necessary to make the patient cough in order to hear the râle.* A râle is usually considered as an intermittent sound. Rough breathing is due to the presence of mucus on the walls of the bronchi.

This impedes the in and out motion of the air, and produces a change in the quality of the breath sounds. If the fluid in the bronchial tubes becomes more sticky, and the air moves with considerable force, it may excite vibrations in the flow of air. The bronchial tubes then act like the pipes of an organ and thus produce râles called *musical râles*. There is a series of more or less musical sounds which starts from the coarse gurgling râles of low pitch, and ascends to the sounds described as "growling", "snoring", "rattling", etc. At first the intermittency of the sound is plain. Then the pitch rises to the more purely musical note in which no intermittency is detected, and finally to the sibilant râle. Musical sounds of this nature are distinguished from râles by the German writers. They speak of growling, snoring, whining and hissing, not of growling or snoring râles.

The importance of the râle lies in the information that it furnishes as to the kind of fluid present in the air passages and its location. If there are coarse gurgling râles there is abundant, not very viscid, mucus in the largest tubes; if the sounds are higher pitched and more musical, they come from the smaller bronchi, the mucus is more viscid and more scanty, and so forth.

Râles differ from breath sounds as to their place of origin. Breath sounds originate in the larynx. They find resonators in the air cells and bronchi and these alter their original character. Râles originate in the air spaces below the larynx and their character is more or less modified by the air chamber in which they are formed.

When a tube is placed in a liquid and air is forced through it the air escapes in bubbles, the size of which will depend upon the calibre of the tube. These bubbles leave the opening of the tube in the form of a hemisphere which bends upward until it comes to resemble a ball of air connected by a tail with the air of the tube, then suddenly breaks loose and rises to the surface. At the surface it bursts in a longer or shorter time, according to the viscosity of the liquid. The gurgling or bubbling sound which is heard when air is blown through a liquid is not caused by the bursting of bubbles upon the surface. If any sound is caused by the bursting of the bubble it is extremely faint and of quite a different quality. The gurgling sound which precedes in point of time the bursting of the bubble is produced, according to Talma[3], by the vibrations excited when the liquid which has been displaced during the protrusion of the bubble from the tube springs back to occupy its former place as the bubble detaches itself.

When two moistened surfaces are suddenly torn apart a sound is produced, which, the viscosity remaining the same, varies in intensity and in quality according to the rapidity of separation of the surfaces. There is no sound when the separation is slow. The sound is at first faint and "moist" in quality; as the velocity increases it soon grows "drier", until with high velocity it becomes a hard, dry crackle, due to a series of minute explosions which do not give the impression of being connected with liquid, but which resemble the crackling of fire in brush. Riegel pointed out that even with water the moist quality of sound is only produced when the movements that displace the water are slow, as, for example, the sound of dripping or of the gentle stirring of water. When water is expelled from a hose-pipe, if the stop-cock is only partly open and the flow of water is slow, the sounds will be liquid in character. When, however, water mingled with air leaves a nozzle under high pressure, the sounds are hard and crackling. This is also true of the impact of water; the sounds will have less of the moist quality, the greater the force with which the water strikes against a hard surface. The degree of dryness in the sound also depends upon the viscosity of the liquid. The force of separation of the moist surfaces remaining the same, a very viscid liquid gives dry sounds; with lessening viscosity the sounds become more and more moist in quality and fainter, until they finally disappear.

Adventitious sounds within the lung may be produced, (1) by the bursting of bubbles; (2) by the detachment of bubbles from submerged orifices; (3) by the separation of moist surfaces. The ordinary moist râles are caused by the first; the second causes gurgling or bubbling râles; the third, crepitant râles. We say that moist râles are due to the bursting of bubbles, but this is not a statement founded on positive knowledge. So far as we can determine by the ear, there does seem to be the bursting of a bubble. We get the impression of a minute explosion, with the suggestion of a delay as if an obstacle were overcome as the preliminary to a rupture. This delay is more marked, the more viscid the fluid.

TYPES OF RÂLES

All râles are "moist", inasmuch as they are produced by moisture. Many writers, however,

distinguish between "dry" and "moist" râles. Which varieties of râles are dry and which are moist? Laennec divided râles (his rhonchi) into dry and moist. He described: (1) the moist crepitant rhonchus, or crepitation; (2) the mucous rhonchus, or gurgling; (3) the dry sonorous rhonchus, or snoring; (4) the dry sibilous rhonchus, or whistling; (5) the dry crepitous rhonchus, with large bubbles, or crackling.

It is seen from this that two varieties are "moist" and three are "dry". The difference between the moist crepitous rhonchus or crepitation and the dry crepitous rhonchus with large bubbles or crackling is due to two causes, the size of the râle, and the amount of moisture present. The moist crepitous rhonchus is the râle of pneumonia, and is due to moisture in the air vesicles in the lung; the dry crepitous rhonchus occurs in emphysema, and is a large crackle or crepitation. As to auditory characteristics Laennec's description is exceedingly good. His dry crepitous rhonchus with large bubbles or crackling is observed only during inspiration. It conveys the impression of air entering and distending lungs which had been dried, and of which the alveoli have been very unequally dilated, and resembles the sound produced by blowing into a dried bladder. It is the pathognomic râle of emphysema of the lung substance, and of the interlobular emphysema. In this last disease it is much more distinct. We have a sound like this in subcutaneous emphysema, on pressing interruptedly with the ear on the stethoscope, or with the fingers on the affected part.

As the moisture or liquid which produces râles becomes more sticky the quality of the râles becomes drier. Since the force of respiration changes but very little, the dryness or moistness of the râle affords an indication of the degree of viscosity of the fluid present. This affords very important information.

Certain sounds which are classed as dry râles are not dry râles, but are extrapulmonary sounds. Such, for example, are muscle sounds. A râle formed in a markedly viscid liquid should have a characteristically delayed and well marked bursting effect. A râle which is distinctly heard, which is rather near to the ear and has a dry sound, but which is atypical in the above respect, is probably not a pulmonary râle.

As we watch a patient with pulmonary tuberculosis progress towards arrest, we observe that the râles become smaller and of drier quality. The fluid or moisture which causes them becomes more sticky, and a musical element also enters into the sound. Not only do we hear moist râles but they also have a creaking or sibilant or even a sonorous sound.

Andral also spoke of the sibilant and sonorous râle as the "dry bronchial rhonchus". John Forbes, who translated Laennec's book into English, also divided râles into dry and moist.

With regard to the louder râles, we should remember that they are often heard through a pleuritic effusion. We should not, therefore, necessarily conclude from their presence that the lungs are in contact with the chest.

Andral[1] stated that since Laennec hardly anything has been added to the excellent description given by him of the different râles; yet Laennec did not specify the precise moment during the act of respiration at which these are heard. Sometimes they are heard only during inspiration, sometimes only during expiration, sometimes equally in both phases. The true crepitant râle which originates in the air vesicles, and which consequently is called the "vesicular" râle, is heard only at the time of inspiration. There is, on the other hand, another râle, very similar in sound, but heard both on inspiration and expiration, and more commonly in the latter exclusively. This râle is produced in the bronchi of small and middle calibre, and cannot always be distinguished from the true vesicular râle, and, consequently, the existence of the one or the other of these râles, apart from the other symptoms, will not suffice to distinguish disease of the vesicles of the lungs from that of the bronchi. The sibilant and sonorous râles which occur in infinite varieties, and which, being also seated in the bronchi, are called by the generic appelation of "dry bronchial râle", are heard perhaps oftener in expiration than inspiration. The mucous râle may be heard about as often during the one as during the other of these respiratory acts. It is probable also that râles may be produced by friction between the two layers of the pleura.

The râles which we hear either on quiet or forced breathing, or on coughing, present many differences. In general, they vary in quality, size, pitch, time of production, intensity, duration and distribution according to the size of the air chambers, the character of the exudate and the condition of the tissues surrounding the site of their production. The condition of the surrounding tissues plays a particularly important part in the character of the sound. As inflammation subsides from lung tissues, râles will often change

from coarse to medium and then to moderately fine. This change is frequently seen in a tuberculous area of the lung as the lung progresses towards arrest. As the surrounding inflammation, called collateral inflammation by Tendeloo, Aschoff and others, subsides, râles will frequently become smaller and drier. When this happens we know that the focus is healing. The presence of consolidated lung gives a sharp, crackling, explosive quality to the sound, whereas when the surrounding lung tissue is of normal texture the sound is usually of a bubbling character.

THE CLASSIFICATION OF RÂLES

Each writer has his own classification of râles, and the result is very unsatisfactory. There are, however, four classes of râles which are called by the same names by almost all writers: (1) the sonorous; (2) the sibilant; (3) the crepitant; (4) the mucous, or moist.

I would like to submit this as a classification, grouping all râles under these four heads. Almost all physicians are acquainted with them.

1. Sonorous râles.—(Latin—sonorus, from sonor, a sound.) "Sonorous" means vibrant, loud sounding, and râles of this type are loud, snoring and low-pitched. They usually indicate that mucus is present in the large tubes, and they often disappear when the patient coughs. The mucus is often thin and tenacious. This râle is sometimes extremely loud and resembles the snoring of a person asleep. At other times it resembles the sound produced by friction on the string of a bass violin; and occasionally it resembles the cooing of a wood pigeon. This last variety of sound is usually confined to a small area. It is also observed in cases of pulmonary fistulæ of medium size, and also in cases of dilated bronchi, probably not of small diameter.

The precise cause of the sonorous râle is difficult to explain. Neither the character of the sound nor the examination of the parts after death leads to the belief that it depends on the passage of the breath through any kind of matter. On the contrary, it would seem to depend rather on some alteration in the shape of the tubes through which the air passes, and should be attributed in most cases to the contraction from some cause or other of the origin of the bronchial branch. This contraction may be permanent or temporary, and may be occasioned by the pressure of an enlarged gland, by a circumscribed spot of inflammation, by the presence of a tenacious clot of mucus, or local thickening of the mucous membrane.

2. Sibilant râles (from the Latin sibilans, present participle of sibilare, to hiss).)These râles are whistling, piping, squeaking, hissing, humming, and are high pitched. Sometimes the sound is like a prolonged whistle, flat or sharp, dull or loud; sometimes it lasts only for a moment, and it may resemble the chirping of birds. The different kinds of sounds often exist together in different parts of the lungs, or may succeed one another in the same part. The peculiar nature of the sound and post-mortem examination seem to prove that the sibilant râle is due to the more or less complete obstruction of the small bronchial ramifications by minute portions of a very viscid mucus. This applies more especially to the variety resembling the sound of a valve; the kind more strictly sibilant is probably occasioned rather by a local contraction of the smaller bronchi from thickening of their inner membrane.

The pitch of the sound of a sibilant râle is chiefly dependent upon the calibre of the tube in which it is produced. Sibilant râles usually indicate that the lining membrane of the smaller bronchi is swollen. They are usually uninfluenced by cough.

Sibilant and sonorous râles may be heard during either inspiration or expiration, or may accompany both phases of respiration. In bronchitis and asthma they are usually particularly marked during expiration. They are dry musical sounds produced in the bronchial tubes, and constitute the "musical râles". Their sound is longer and more continuous than that of the other râles. They are heard particularly well in asthmatic cases.

Sibilant and sonorous râles are found in acute bronchitis; also in connection with every other pathological condition which has been described in the lungs, such as asthma, scattered tubercles, massive caseation, fibrosis, cavity formation, pneumonia and pleural effusions. All of these conditions may have bronchitis associated with them. The cause of their occurrence is commonly stated to be moisture, or lessening in size of the smaller bronchi from congestion or nervous contraction. Joseph Walsh[4] considers that they are caused solely by moisture; lessening in size being unnecessary and therefore probably without influence.

Both these râles may be produced outside the body by blowing through a pipette over moist

leather, over the mucous membrane of a freshly removed bladder, or large bronchial tube. When the amount of moisture is small, sibilant râles are produced; when the membrane is soft and soggy with moisture, as in a bladder, sonorous râles are produced. These râles aid in the diagnosis of acute bronchitis, provided no other condition is suspected, but they add nothing to a complicated condition with which congestion of neighbouring bronchi might coexist.

3. Crepitant râles.—This type is a peculiar crackling or crepitating sound heard with inspiration in pneumonia and other lung conditions (Latin, crepitare, to crackle. To crepitate is to make a series of small, sharp, rapidly repeated explosions or sounds, such as are produced when salt is thrown on the fire.). A crepitant râle or a crepitation is a sound almost exactly similar to that produced by rubbing the hair between the fingers close to the ear. The term requires no adjective such as "fine" to describe it, because the quality of "fineness" is implicit in it. Its use should be confined to sounds of this character. The crepitant râle corresponds to the moist crepitant rhonchus or crepitation of Laennec. Crepitant râles, or crepitations, are caused by the entrance of air into vesicles either containing a fibrinous or fluid exudation, or in a condition of collapse. They correspond to the "vesicular râle"—das vesiculäre Rasselgeräusch —of the Germans, as described by C. Gerhardt[5]. (He called these râles also "Knistern" or "Knistern-rasseln".) Norris and Landis[6] state that they are also known as "consonating râles" (from the Latin, consonare, to sound at the same time, to agree, to resemble). They are very fine, chiefly inspiratory, constant, clear cut, and high pitched, are uninfluenced by cough, and are probably alveolar in origin. In addition to crepitation, a sensation of humidity in the part is imparted. We feel that the lung cells contain moisture as well as air, and that the intermixture of the two produces bubbles of extreme minuteness. Crepitant râles often have a metallic quality, especially when associated with cavitation or consolidation. *These are the characteristic râles which are heard in the early and late stages of pneumonia* (*crepitus indux and redux*). They are also heard in bronchopneumonia, infarction, pulmonary tuberculosis, and at the bases of the lungs when in a state of œdema, collapse and hypostasis. "They are the only râles produced in the alveoli and indicate parenchymatous involvement of the lung" (Norris and Landis[6]).

The crepitant râle is one of the most important, and also one of the most easily distinguished. Though found in œdema of the lungs, and sometimes in pulmonary apoplexy, the bubbles in these conditions usually seem to be somewhat larger and moister than in pneumonia, and are therefore called "sub-crepitant" râles.

Crepitant râles are usually very abundant. We assume that air and fluid are in the alveoli, and that the râles are produced by the bursting of minute bubbles of moisture. It is not proved, however, that this represents the true nature of the process; another explanation is possible. If one inflates the lung taken from a freshly killed animal, the most distinct crackling is heard in the lung. Crackling is also sometimes heard which cannot be explained by fluid in the lung cells. When weakened patients who have been for a long time on their backs draw a few deep breaths, one hears at the posterior and lowest part of the lung during the first two breaths pronounced, ringing, crackling râles, which appear somewhat drier than usual. In both cases it is assumed that with the collapse of the lung the alveolar walls became adherent, and that through their separation during inflation the crepitation is induced. This fine and equal bubbling râle sound is of importance especially for the recognition of incipient lung inflammation, and also for the determination of the beginning of the resolution of an inflammatory process in the lung. In order to hear crackling (crepitation) one must often first make the patient cough, or cough and breathe deeply.

Subcrepitant râles, also called "crackling râles", are coarser and lower pitched than crepitant râles. They were first called such by Laennec, and can be simulated by rubbing a dry cigar between the fingers or by sprinkling salt on a hot stove. They have their origin in the bronchioles, and are heard in cases of pneumonia, bronchitis, pulmonary congestion and œdema. Friction sounds may simulate both the crepitant and the subcrepitant râles. The subcrepitant râle occurs in the same pathological processes as the crepitant, but is formed in a different place. It is a small râle, and occurs only in showers on inspiration, and follows the crepitant râle in the evolution of pneumonia. Pratt and Bushnell[2] insist that its smallness should be regarded as a marked characteristic. They also insist that the term "subcrepitant" if not applied strictly to the

râle of the pneumonic process is superfluous, for it would simply denote a small moist râle; it should, therefore, be restricted to the small moist râle of pneumonia. They emphasize the importance of accurately distinguishing crepitant and subcrepitant râles from other small râles. This distinction enables the diagnosis of pneumonia to be made with accuracy, even though the pneumonic patch be small, and is of special value in the diagnosis of tuberculous pneumonia. The differentiation is made by the size of the râle; crepitant and subcrepitant râles are smaller than other similar râles that appear in showers. Laennec also did not regard the subcrepitant râle as a distinct variety of râle, but as a crepitant râle which was larger and moister than the real crepitant râle. We concur in this.

Robert Spittal[7] gave some account of the sounds produced by the bursting of bubbles on the surface of different fluids when agitated. He found that fluid of the density and tenacity of serum gave rise to sounds most nearly resembling those of the crepitant râle. M. Piorry[8] states that the same sound can be produced in the dead body by injecting fluids into the lungs.

4. Moist râles.—Râles which we frequently hear in a chest are caused by the presence of mucus, and are therefore called mucous or moist râles. This type of râle is characterized by sounds that denote the presence of liquid of considerable viscosity. It corresponds to the mucous rhonchus of Laennec, and is produced by the passage of air through sputum which has accumulated in the bronchi, or through the softened matter of tubercles not discharged. Mucous râles present many varieties of character, and it is very difficult to describe them accurately. In listening to them we receive the impression of bubbles, such as are produced by blowing through a pipe into soapy water; the ear seems to appreciate the consistency of the fluid which forms the bubbles, and also their varying sizes. The consistency of the fluid appears always greater in the moist than in the crepitant râle. From the quality of the sound alone it is not always possible to distinguish between the mucous râle of high viscosity and the sound produced by the separation of sticky surfaces, or muscle and fascia sounds. The term *râle should not be applied to any sound which is not produced by moisture.*

Laennec divided the moist râle, or mucous rhonchus, as he called it, into "very large", "large", "middling" and "small". This is an excellent description and cannot be improved upon. The present day divisions of the moist râle are "coarse", "medium" and "fine". For purposes of description we might divide the moist râle into "coarse", "moderately coarse" or "medium", "moderately fine", and "fine". "Coarse", "medium" or "moderately coarse", and "fine" would seem to suit all purposes. Such terms as "almost coarse" and "almost medium", can also be used. These terms convey to the reader the size of the râle. The term "very large" used by Laennec is good, and when we hear such a râle we should always think of a possible cavity.

When we hear the crepitant râle of pneumonia, it seems as if an exceedingly large number of minute equal-sized bubbles, formed at once, were vibrating, rather than boiling, on the surface of a fluid. The moist râles, on the other hand, always seem to be larger, and as a rule they are unequal in size, and convey the idea of a liquid into which someone is blowing and thereby producing bubbles, of which some are of the size of a filbert and others only as large as a cherry stone or hempseed. Though moist râles usually occur unequal in size, we should describe them according to the largest sized râle. For instance, if we hear a shower of râles, varying from coarse to fine, we should call them coarse râles. In this way we can visualize the underlying pathological condition.

We can also estimate the number of râles that are present, as well as their size, and can describe them as numerous or few. Sometimes it seems as if the area of lung beneath the stethoscope is filled with râles; at other times, as though a râle were only here and there, while the intervening lung yields the normal respiratory sound, or yields no sound. When the moist râles are very large and infrequent, we can almost perceive the bubbles to form and burst. When they are numerous, large and constant, they are sometimes so noisy as to resemble the rolling of a drum.

5. The *"Tracheal râle"* is a variety of the moist râle, and is observed when much mucus or other sputum has accumulated in the larynx, trachea, or larger bronchial tubes, and may be readily heard by the unassisted ear, as in the death-rattle. Laennec was the first to describe it and called it the "tracheal rhonchus".

This variety may exist without there being any other perceived by the stethoscope. When examined by the stethoscope, this râle, which has its seat in the trachea, has almost always the

character of the mucous râle. The bubbles seem to be extremely numerous and very large. The sound is occasionally so loud as to resemble a drum or the noise of a carriage on the pavement. In these cases the râle is perceived over the whole sternum, and is accompanied by a vibration very perceptible to the touch; we can even sometimes perceive it over the whole chest and through the interposed lung. It is sometimes so noisy as to mask the sound of the heart's action, and also of respiration, over a great portion of the chest. It is only observed in this great degree in violent hæmoptyses and in the severer paroxysms of the mucous catarrh of old persons, termed "suffocative catarrh". It is found in most dying persons, particularly in cases of phthisis and in diseases of the heart. In all cases, when it exists in a high degree, it may be regarded as of evil omen. In a lesser degree it exists in the acute pulmonary catarrh, in the severer cases of the chronic mucous catarrh, and in all diseases complicated with these.

6. Cavernous râles.—When râles originate in cavities they have a peculiar character and were called *cavernous* by Laennec. The cavernous râle occurs usually in very large numbers, is exceedingly coarse, and is confined to a relatively small space. Over this small area we often also observe both cavernous respiration and pectoriloquy. Even without the associated presence of pectoriloquy and cavernous breathing, when we observe very coarse moist râles over a relatively restricted area, we should always suspect a possible cavity. The typical cavernous râle, however, has a peculiar character, and it is more especially during cough that we detect it. Laennec thought that sometimes he could even distinguish the consistence of the fluid contained in the excavation, by means of the particular impulse communicated by the cough.

All the other varieties of râles, although depending on a pathological condition of the part of the lung in which they originate, still have their site in spaces naturally existing in the state of health. The cavernous râle is in every respect pathological, in its site as well as in its cause. It may exist in all cases where there is a pathological excavation in the lungs containing a fluid, and communicating with the bronchi, as in circumscribed abscess of the lung, in local gangrene of the lung and in advanced tuberculosis of the lung. Advanced tuberculosis of the lung is by far the most usual source of this râle, and according to John Forbes[1] it is doubtful if it arises once in a hundred times from any other cause.

The cavernous râle is a very coarse moist râle confined to a small area instead of being diffused over a considerable portion of the lung, as is usually the case with the common moist bronchial râle. It is best heard when the patient coughs. If, under such circumstances, it is very strongly marked, continues localized over the same area, and is not heard elsewhere, it is extremely suggestive of tuberculous excavation, even without pectoriloquy and cavernous respiration, both of which, however, will usually be observed at the same area. Andral also regarded this circumscribed, bubbling, very coarse moist râle, when well marked, as the very surest sign of tuberculous cavity.

Laennec drew attention to the fact that in certain rare instances the moist râle may be recognized, or at least suspected, independently of auscultation, either mediate or immediate. He sometimes noticed, while percussing the clavicle or neighbouring parts of the chest, in tuberculous persons, a sort of vibration like that yielded by a cracked pot when gently struck, accompanied by a hollow resonance. He regarded this as indicating the presence of tuberculous excavations near the surface of the lungs. This is called *the cracked pot note.* It is not common, and has been observed in patients with very thin walls. Some of these patients are themselves conscious of the vibrations of the fluid in the cavity during percussion. Some can point out the seat of the cavity from the sensation caused by the detachment of the sputum from it during expectoration. This last is exceedingly uncommon.

Laennec sometimes—very rarely—perceived in tuberculous excavations of the upper lobes, a mucous râle corresponding with, and probably caused by, the pulsation of the subclavian artery. In an equally rare class of cases, a strong mucous or cavernous râle can sometimes be perceived by the naked ear, or on applying the hand to the part. He did not allude to the gurgling râle of the trachea or the bronchi but to one confined to a small space, and often at a distance from the larger bronchial tubes. He observed this phenomenon only in cases where the matter of an excavation had made its way through the walls of the chest, and formed a tumour beneath the skin; or where it had escaped into old cellular adhesions uniting the lungs to the chest; or finally, where a large excavation, half full of

matter, lay near the surface of a lung closely united to the walls of the chest.

7. Serous râles.—It is opportune to mention here *serous râles*, which are the least viscid of all râles. These are only occasionally heard in the chronic lesions of pulmonary tuberculosis under conditions which are little understood. It seems as if the lesion had been flooded with a non-viscid fluid through which air bubbles. They are very numerous, and burst without the characteristic delay of the mucous râle. It seems as if the rupture of the bubble were not attended with resistance, and the sounds have a peculiar soft breezy quality which cannot be described. The phenomenon is usually transient. In addition to the sound produced by the various kinds of râles, there is also to be noticed a slight vibration communicated to the stethoscope when the site of the râle is immediately beneath it. This sensation, like that produced by the voice, may sometimes be distinctly felt by the hand. It is usually very strongly marked in the case of the mucous and sonorous râles, less in the crepitant, and still less in the sibilant. When the râle has its site remote from the point where the stethoscope rests, although it is heard very strongly, no vibration is felt; and when vibration cannot be felt at any point on the chest we may conclude that the cause of the râle lies in the central parts of the lung. The mucous and crepitant râles are only heard close to their site of production. The other varieties may be heard through the whole width of the chest, and are often combined with the former. We sometimes hear a mucous râle in one side of the chest and at the same instant hear a sonorous râle which has its seat in the opposite lung.

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THE GENERAL SIGNIFICANCE OF VISUAL TESTS*

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EVERYONE who must specialize, to do honest and thorough work in any branch of medicine or surgery, must also keep a broad interest in the work and progress of other branches, or he will lose touch with the general advance of our profession and drop out of line, lose contact with the knowledge, progress and service of his day. Because in these meetings we must take time for the general bearings of all special knowledge, it seems not out of place to consider some general aspects of the tests of vision already more or less familiar to those who give special attention to the recognition and treatment of visual defects.

Tests of vision include both subjective and objective elements; and to understand them well, they should be tried by the physician on himself. A good one to begin with, is to test your own *vision with closed lids*. This is the kind of vision possessed by an eye with mature cataract. By making the experiment on yourself you can know just how an eye with cataract, or a dense leukoma of the cornea, or a vitreous filled with dense opacities, *really sees*, although it may be blind for industrial purposes. Stand before an electric lamp, turn it off, and wait two to five minutes for the eyes to become adapted to darkness. Then, with the eyelids entirely closed, but facing the lamp, turn on the current. Immediately the field of vision will be lighted, and the red colour of light coming through the lids is very noticeable.

By turning the eyes in various directions, you can notice if you are looking toward the light, and its position in relation to yourself as you move about. Marked changes in colour can also be noticed after the eyes have become somewhat adapted to the general red colour of the light coming through the lids. A certain amount of light reaches the retina through the lids, sclera and choroid, while we are using our eyes. The retina is functionally adapted for seeing under these conditions, and its state of adaptation

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should be taken into account with all visual tests. The adaptation of tests to the particular case will always remain a duty of the physician.

In *testing for blindness*, our visual tests must often be wholly objective. In this way we can judge the vision of an infant, a lunatic, or a malingerer. The pupil reactions generally give a good idea of vision, although in some cases paralysis of iris-sphincter, or pupillary adhesions, may prevent any reaction. A cortical or subcortical cerebral lesion may cause complete blindness, without any loss of light reaction of the pupil. But these cases are extremely rare, and nearly all of them have a history or symptoms pointing to such a lesion. Of course, coincident disease, affecting the motor nerve supply of the iris, as in the Argyll-Robertson symptom, must be considered. The Wernicke hemianopic inaction sign is of little value when attempted by refined laboratory methods and apparatus, but it is helpful when used by alternately covering the eyes with the hand, as described by Fisher of London.

In testing the vision of infants we must look at the pupil, but should also watch the reaction of the whole child. The room should be partly darkened, but light enough to give the conditions under which the child has been accustomed to make what use it can of its eyes. An electric flash-light, held near its point of fixation, and afterward toward the periphery of its normal field, will at once command the attention of a seeing child. The turning of the head toward the light, or following the light when its position is changed, indicates both light perception and a field of vision. Continued and varied tests of this kind give a fair idea of the acuteness of vision and extent of the field. The insane or the malingerer may *refuse to look in the direction of the light*, which indicates a definite conception of where the light is. And a mental fault is also shown by refusal of an older child or adult to fix his gaze upon the end of his own finger, as the person who has become blind can and will do.

Tests of vision with charts of letters or numerals have been the most common and important of visual tests. But unless certain precautions are taken such tests may be quite inaccurate and misleading. Test letters are very convenient, and they always will be important for the subjective testing of refraction. But no series of letters can furnish a scientifically accurate test for vision. The letters are useful because they differ in form, but the different forms differ in visibility. Snellen selected capital "block letters," that could each be inscribed in a square, of which each side would subtend an angle of five minutes. But in his first tests he found that the different letters of the same size were distinguishable at different distances, and he, therefore, rejected some letters of the alphabet as unsuited for such use. The letters were printed in lines, each line marked as visible at a certain distance—20 feet, 30 feet, 40 feet—where each letter subtended the angle of five minutes. Yet with average normal eyes, only two 20 feet letters, B and S, were just visible at 20 feet. Snellen insisted that all the letters on a line must be recognized. Some letters of the same size could be seen at 25 feet, others at 30 feet, and a few at 40 feet. Yet Snellen proposed his method of recording vision by vulgar fractions, using the distance at which the letters could be read as the numerator, and the distance at which they were numbered to be read as the denominator, as 20/30ths, and 20/40ths, etc. He soon found the letters he had first chosen were not equally visible and rejected some of them. Other users modified the forms of the letters used. John Green used "half-block" letters, in the effort to make them more uniformly visible. Others tried the Gothic letters, because simpler, or they reduced still more the number of letters employed. But many of those who have used cards of test letters recognized their departure from any scientific equality, and added a minus sign when not all the letters of a line were recognized, or a plus sign when some smaller letters were also recognized. Thus we have records like 20/20 minus 2, or 20/30 plus 3—records having no exact value unless the particular letters, seen or not seen, were noted, like 20/30 minus S.

An incomplete square. This size for use at ten metres.

Snellen later introduced other figures into his lines of test letters, a cross, a circle and particularly the *incomplete square*. Each side of such a square subtended an angle of five minutes, but one side was omitted. The omitted side made a good test, but it left an opening of three minutes, instead of one minute, the angle originally chosen for the width of the lines and open spaces. On this account Snellen introduced a middle bar in the square, making what he called "Haken,"

(hooks) but which is usually known as "the Snellen E."

Landolt proposed the *incomplete ring*, which was adopted in 1909 as the international test for visual acuity. It is a ring of five minutes in diameter, but with a part, subtending an angle of one minute, left out on one side. The writer has modified the incomplete square, by making it *three minutes* on a side, with the break of one minute on one side. (See Fig.) Such figures constitute our best tests for visual acuity. And the best way to use cards of test letters and know the real visual acuity is to mark the lines of letters to correspond with such standard tests.

But with ideal tests other things also must be taken into account. Years ago the clinical assistants at Wills Hospital used to make records of vision like this: V.= 20/40, "dark day," and were not surprised when the same eye on a bright day showed V. = 20/15. The illumination of the test card and of the background, or the field surrounding the test, must conform to some standard, and the previous exposure of the eye to light must be known before we can have a record of the vision that is scientifically accurate and suitable for future comparison, either from day to day in acute disease, or in after years for an advancing cataract. But when we have an exact scientific record, in the usual form of 20/20 or 22/100, we have only attained a very small part of the general significance of what may be learned from visual tests.

Our best test cards give only the acuteness of vision in the region of the fovea, at the centre of the yellow spot. As measured by such tests, the *acuity of the peripheral parts of the retina* is generally very much less than that at the fovea, but for some purposes the vision of a part of the retina 40 degrees, or 90 degrees, away from the fovea is much more important. To catch instantly the presence of an automobile coming on a cross street, to find a four-leaf clover, or a weed in the lawn, or a coin or a ring that has been dropped, we must depend on the sensation from peripheral parts of the retina. In scotopic vision, seeing at night or in the twilight or dawn, the periphery of the retina is more sensitive than the macula. It is quicker to perceive slight movements. The small animal or bird we see holding its head very still, "frozen" as the naturalists say, is looking with its whole retina, watching in every part of its field of vision to detect its food or enemy. Peripheral vision is very important to the lower animals, and in some occupations, or as an evidence of commencing disease; it may be more important than a high standard of central or macular vision. The loss of peripheral vision may cause more disability than great reduction of visual acuity, as we estimate it with test letters.

To take up the different tests for the field of vision, and the special significance of each form of impairment of the field in the domain of pathology, would be another story, and a long one. Even striking cases, like the tubular fields of retinitis pigmentosa and quinine blindness or of hemianopsia, such as once made certain the diagnosis between a small cerebral hæmorrhage and intoxication, or which, in another case, was the first definite sign of cerebral progressive softening, cannot here be dwelt upon.

But one old method of testing the field of vision, unknown to some and fully appreciated by few, is the *confrontation test*. Doctor and patient confront each other, eye to eye. The doctor looks with his right eye, the patient with his left eye, or vice versa, each with the other eye closed. Then their two fields of vision coincide on the plane half way between them. The doctor brings his fingers into the periphery of the field, and has the patient tell him when they are still, or when he moves them. This has the certainty of an objective test. The apparatus is always at hand. The patient's powers of observation and honesty can be judged; and it is a means of training the patient for field-taking that I always resort to, whatever means of recording the field may be used afterward.

Nothing has been said of colour blindness or the tests for colour perception. Our knowledge of colour testing is still fragmentary and recent. But for certain occupations the importance of full normal colour sense cannot be too strongly emphasized. Probably the number of traffic accidents, on sea, or land, or air, that are due to defective colour sense is still much underestimated. Most of the dangerous colour-blind persons do not know that they are colour-blind. Even if they suspect some defect in their vision, they say nothing about it when an accident has occurred. And only in a few places has there been systematic search for the defective colour-sense that might have caused a serious accident. On the other hand, the mass of tests that have been made in railroad and marine services for colour-blindness have been by routine methods, not calculated to detect all sorts of cases; and these were applied with a bias against throwing

anyone out of his accustomed means of livelihood, because of a defect that is rarely felt in ordinary life and have been regarded as chiefly of academic interest. As to the recent use of colour signals for automobile traffic and in aviation practically no statistics as to dangerous colour defects have been gathered.

With regard to the significance of impaired colour-sense in disease very little is known, and many of the observations that have been recorded are of doubtful interpretation. The methods of mapping the visual fields for colours are based on apparatus and technique that apply chiefly to the testing of cone-vision near the centre of the field. It is still uncertain if narrowing of the field for colours has any significance, other than that which attaches to narrowing of the field for black and white, as tested by smaller test objects. Alterations in colour-perception may yet be found that will give early and significant evidence of disease, but up to this time there is little of importance recorded on this subject.

The broader and more important aspects of vision and tests of vision are only becoming manifest as we learn more of the evolution of this sense, which dominates the civilization of our time. Within the last ten years, three "Bowman lectures" have been given, before the Ophthalmological Society of the United Kingdom, and published in its Transactions, that have changed our conceptions with reference to the sense of sight and many of its relations. The first of these, in 1921, by Mr. Treacher Collins, took up the changes that came to the vision and ocular movements of our arboreal ancestors. When the primates began to live in trees they escaped from many of their enemies, had less need of the wide field of vision gained by eyes placed on opposite sides of the head; but they needed accurate seeing for small objects, and exact judgment of short distances, secured by the eyes being placed in front, where they could cooperate in a new kind of vision, binocular vision, exactly secured and maintained by accurate binocular movements. They also gained, what they needed, accurate discrimination of colours, even of small objects.

In 1925 Sir John Herbert Parsons took up what he called "protopathic" and "epicritic" vision. The former, possessed by the lower vertebrates and mammals up to the monkeys, included the wide field of vision extending sometimes to the whole horizon, the very quick perception of any movement, and the ability to have serviceable vision by feeble light, scotopic vision. It did not include accurate vision for small near objects, or binocular vision, or very accurate binocular movements. These came with what is called "epicritic" vision. The sense of sight became in a high degree discriminative, in direction, colour and relative distance.

In 1928, Elliott Smith, one of the professors of anatomy in the University of London, perhaps our greatest teacher of the anatomy and comparative anatomy of the central nervous system, lectured on the development of the macula and of the visual tracts and connections—the great mass of cerebral convolutions, to which he has given the name of the "neopallium." He pointed out that the macula, with its thickly massed retinal cones, each with its independent connection with the central nervous system, differed essentially from the percipient rods of the retina in that several rods were connected with a single nerve cell and nerve fibre. He showed that the development of the macula, the increase of fibres in the optic nerve and tracts, and the development of the "neopallium" all came together. This implied that this new development of epicritic vision, this mind for visual coordination and comparison, its wealth of visual memories, a dominance of sight over the sense of smell, as expressed in the relative size of brain convolutions, this governing of movements and actions by vision, this voluntary and purposive control, came with the development of accurate macular vision.

In 1861, Ezra Dyer was studying with Snellen in Donders' Clinic, at Utrecht. Late in that year he returned to Philadelphia, and met S. Weir Mitchell, the foremost American neurologist of his time. He met Mitchell's favourite question, "What's new?", and talked with him about the work Donders was doing, about the visual test that Snellen was working up, and which Dyer got printed for his own use, some months before the first edition of Snellen's test-types had appeared. Dyer began measuring the refraction of Mitchell's patients. From the union of these active minds came ideas of eye-strain and resulting nerve-strain with its influence on metabolism, that are still developing and extending our control of the disabilities and suffering that arise from ocular defects and in many of the emergencies of life.

UNDULANT FEVER IN BRITISH COLUMBIA*

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UNDULANT fever is a disease of the human being due to an organism, or organisms, or strains of an organism, usually reaching him from goats, cattle or swine; the organism derived from each one of these three sources presenting some differences from those derived from the other two. There is as yet only suggestive evidence as to transmission from human being to human being.

Infection of the human being, recognized by a positive agglutination or skin-sensitivity reaction, apparently often occurs without obvious symptoms. When symptoms do occur they are quite variable. The most frequent seem to be weakness, general malaise, fever, headache, sweats, chills or chilliness, anorexia, aching pains in the muscles and joints, loss of weight, constipation, coated tongue. The spleen may be tender and palpable; there may be anæmia, with a normal or low total white count and low polymorphonuclears; while neuritis, orchitis, arthritis, palpitation, prostration, and premature ageing, occur in prolonged cases. Occasional fulminating cases have been noted. The attack usually lasts three or four months, but wide variations occur. Recurrences may be more or less periodical. The disease has been confused with typhoid fever, influenza, tuberculosis, malaria, encephalitis, etc. The fatality being very low, autopsies are rare and the pathology not very definite. Löffler[7] describes a successful operation on an undulant fever patient for the removal of the spleen. In this case the spleen, and apparently also the liver, at operation were found to contain numerous small granulomatous foci, diffuse inflammatory changes, and a chronic endophlebitis.

Undulant fever, as derived from goats, has long been recognized in the Mediterranean basin, where it is known as Malta fever, Cyprus fever, Gibraltar fever, Mediterranean fever. Here Bruce in 1886 isolated an organism, later named *Micrococcus melitensis,* from spleens of soldier patients, but it was not until 1905 that the human disease was traced to the use of raw milk from goats affected by the same organism, which in the goats was more or less associated with abortion. This goat origin for human undulant fever has been found in Africa, India, the Philippines, China and the southern United States. Meantime, in 1897, Bang, of Denmark, isolated a bacillus from contagious abortion in cattle, which was for long considered non-pathogenic for human beings. In 1918, however, Alice Evans, of Washington, D.C., showed that the micrococcus of Bruce and the bacillus of Bang were very closely similar, and in 1924 Keefer, of Baltimore, found Bang's bacillus, causing undulant fever in a human case. The two organisms are now known as *Brucella melitensis* and *Brucella abortus,* respectively.

Since the bacillus of bovine contagious abortion (*i.e., Brucella abortus,* the Bang bacillus), was thus shown to produce undulant fever, or a variety of it, in man, this disease in man as derived from cattle has come to be recognized in northern Europe, England, Italy, South Africa, the United States and Canada in varying numbers,—the United States figures showing about 1,200 cases identified up to May 1929 and many more since. Canada has contributed a few.

The first Canadian cases were described in 1928 by Harris, McCoy, Stevens and Lyman,[9] by McLean, McKinnon, Young and Jeffrey,[10] and by Warner and McLean.[11] McKay and McNabb[12] reported 14 cases from Ontario in 1929.

Letters addressed to the various Canadian Provincial Health authorities elicited the following data, up to May, 1931. These figures are necessarily approximations only, and are stated for varying periods. Doubtless not all cases of undulant fever are recognized, nor are all recognized cases reported. Nevertheless, it would appear that there has been a greater preponderance of recognized and officially reported cases

* Prepared for the Canadian Medical Association meeting in Vancouver, but not read owing to the illness of the author.—[Ed.]

from Ontario to the Pacific Coast than from Quebec to the Atlantic Coast.

The figures returned by Provincial authorities are as follows:—

	Cases
Prince Edward Island ("last three years")	0 cases
Nova Scotia (for 1930)	4 cases
Quebec ("many years")	1 case[13]
Ontario (1928-1931)	86 cases
Manitoba (long period)	1 case[14]
Saskatchewan (1930-1931)	8 cases
Alberta (1930)	3 cases
British Columbia (1928-1931)	5 cases

Deaths—0.

In addition to the above, at least 229 *positive reactions* for *Br. abortus* and 31 for *B. melitensis* were recorded in persons not known to be suffering, or known not to be suffering, from undulant fever.

Doubtless very incomplete, the above figures nevertheless illustrate the very much greater frequency of blood reactions than of cases; and emphasize the low fatality of the disease.

The exact source, vehicles and routes of infection in undulant fever cases have aroused much investigation and discussion. While it would appear that *Br. abortus* (Bang bacillus) occurs frequently in the milk of infected cows and is doubtless ingested frequently by raw milk drinkers, there is much evidence that children relatively seldom succumb, and that the incidence of the disease is chiefly in adults, males predominating; so that those who chiefly drink milk are not those chiefly affected. Wide variations in pathogenicity, susceptibility, and dosage doubtless are factors in the erratic distribution of cases. This surely does not indicate raw milk as a main, and certainly not as an exclusive, vehicle; and it would seem that raw milk has been definitely incriminated in only a proportion of cases. Roth[2] quotes 50 cases in California, 1927-1929, apparently due to raw milk—one in a baby using certified milk only. But a large number of cases would appear to be derived by direct contact with infected animals, particularly cattle and hogs, since the disease more frequently occurs amongst the relatively small group of those who have to do directly with infected animals, alive or dead—cattlemen, veterinarians, butchers, packing-house workers, etc.—than amongst the relatively large group of raw milk drinkers. In these persons thus directly exposed, infections by simple contact and also through cuts or abrasions seem to predominate. It has even been suggested that the bacteria of this group may have the power to penetrate the uninjured skin. Some laboratory infections with this organism strongly suggest this possibility, unusual as it is in connection with other species of bacteria except plague.

Of the strains isolated from cattle and hogs, that from hogs is held to affect the human being most seriously, the bovine form least. But as the porcine form may infect cattle and thus reach man through cow's milk, infected cow's milk, all the more, cannot be regarded as always innocuous, since it may convey the porcine strain as well as the more common bovine form. Strains have been isolated from horses, dogs and poultry also, but as yet these sources have not been shown to constitute a great menace to the human race.

It would appear that these infections, particularly perhaps those derived from cattle, do not by any means necessarily precipitate the disease; and that, therefore, positive blood agglutination tests and skin-sensitivity tests occur in well persons—probably more commonly than the actual clinical disease. The same groups of persons in which the incidence of the disease is high show also a high incidence of blood agglutinations without any recognized clinical symptoms. Whether these well persons showing infection are carriers, *i.e.*, spreaders of the infection, in large or even in small percentage, does not yet appear. But their existence brings about hesitancy in accepting a positive agglutination test as conclusive evidence in the diagnosis of unidentified fevers, since an intercurrent infection in a person who in previous health possessed this reaction might be interpreted as undulant fever because of a previously existing reaction still persisting. An analogous situation exists, of course, in attempts to diagnose typhoid fever by agglutination tests in a community where there are many well persons showing the Widal as the result of old infection, inoculation, etc.

A skin test may be positive, with agglutination negative, and the Bang bacterium may occur in the blood stream without agglutinins. (Meyer[1]). Our experience (Menzies,[3] Pottinger[4]) in British Columbia shows more positive reactions in well persons or sick persons not suffering from undulant fever than in persons proved to be suffering from this disease.

The following case is therefore especially in-

teresting, since it is one of the few which we, in British Columbia, have good reason to believe was actually due to the *Br. abortus*. Drs. C. H. Vrooman and W. D. Paton, of Vancouver, were associated in the care of this case.

A physician suffered a variety of symptoms, chiefly occasional fever, minor headaches and body pains, fatigue, and a general rundown condition, for about six months, continuing his work however. At the end of this time, he was forced to give up for a few days, but after some slight improvement, he began going about again. At this time a blood agglutination test was Bang positive (1 in 1,600). The red cell count and hæmoglobin were normal; white count, 5,500, with polymorphonuclears 49 per cent. A skin-sensitivity test, also proved positive, the papule which resulted remaining evident for about six weeks.

The patient was given an injection of Bang vaccine, but without advantage, perhaps rather the reverse. He then received 40 to 50 c.c. of a ½ per cent solution of acriflavin intravenously. The same evening he had a chill, but following this he promptly improved very greatly. About a week later however, he again became worse and was given a second injection of acriflavin, in the same dose. No chill followed this time and he has been entirely well ever since.

The patient thinks he contracted the disease thus. He operates, as a hobby, a high-grade dairy cattle farm. Being appealed to for help by a neighbour, whose cow was in labour (aborting at 7½ months—the calf died), he undertook to remove the placenta. He was aware that he had a large abrasion on the little finger of the right hand, and thought of returning to town for rubber gloves, but finally decided to use bare hands. Looking back, he believes the symptoms developed shortly after this incident. The abrasion took about two months to heal and he supposes he was infected through it.

He never drinks raw milk, only pasteurized; and he had nothing to do with known contagious abortion in cattle before or since the above incident. There was no definite serological proof that this cow was infected with contagious abortion. A test sometime previous to the labour was negative, and the cow has not been tested since, but other cows in the same herd have shown positive Bang reactions.

This case apparently illustrates direct infection through a skin lesion, in a person who drank only pasteurized milk; the prolonged but mild and indefinite ambulatory illness following yielding no clinical diagnosis; the finding, as the case grew worse, of a strong (1 in 1,600) agglutination test with *Br. abortus*, and a typical white count; the use of a stock vaccine, apparently unsuccessful, but not continued long enough for a definite conclusion; and complete recovery under intravenous acriflavin therapy.

It is interesting to recall that tularæmia, due to a closely allied organism, is usually derived in the human patient through infection of cuts or abrasions on the hands of those dealing in or skinning rabbits with this disease.

As bearing on the question of the production of abortion in the human female by this organism, evidence collected by Carpenter and Boak[6] may be considered, suggesting the possibility that human females may abort as the result of undulant fever. It is true that abortion may follow any severe infection, smallpox, influenza, etc.; but these authors think the evidence for at least occasional specific activity of this organism in this direction is sufficiently strong to make worthwhile the consideration of undulant fever infection as a possible explanation in otherwise unaccounted for human abortions. The actual symptoms of undulant fever need not be present, but agglutination, and especially the finding of the organism, would certainly be suggestive. They suggest also that unexplained genito-urinary lesions in male as well as female may sometimes be accounted for as the result of undulant fever.

It is worth while to record a brief outline of the disease in bovines (Mitchell[8]). Bulls are infected, but seem to suffer little, and are not considered at present a serious factor in the spread of the disease amongst cattle. Sucking calves, in this paralleling human children, are usually resistant to infection. The female calf once infected would seem to show little until adolescence, when the genital apparatus may be involved, certainly as soon as pregnancy develops. During pregnancy, especially in the later stages, the organism may attack the epithelium of the chorionic villi, which interferes with the nutrition of the fetus, resulting in abortion. A cow may abort once only, but occasionally twice or even three times, but many develop an immunity and bear normally thereafter. Some become permanently sterile. Not all that are infected abort. In intervals between pregnancies the organism seems to flourish chiefly in the mammary glands and associated lymph glands, escaping at times in the milk. The uterus is infected during pregnancy and for a few weeks after. Infected animals usually give a positive agglutination test, which, however, may become negative during pregnancy. Pasteurization makes milk safe.

SUMMARY

Undulant fever in Canada does not appear as yet to be widespread as a disease; but the agglutination test is not rare; and is found in well people, or in sick people not suffering from undulant fever, as well as in true undulant fever cases.

Such cases as have been listed by Provincial Boards of Health indicate that the disease has been recognized rather in Ontario and to the westward than to the eastward.

While it is well that obscure fever cases should be considered as possibly undulant fever, positive agglutination tests alone should not be accepted as conclusively indicating the presence of the disease, and most careful clinical study of the case is indicated before a final diagnosis is made.

Isolation of the organism, while difficult, adds of course very materially to the proof, but in view of the probability of human carriers, is not necessarily pathognomonic.

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MENTAL AUTOMATISM, A PROVOCATIVE FACTOR OF THE CHRONIC HALLUCINATORY PSYCHOSES*

BY JEAN SAUCIER, M.D.,

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IN their endeavours to elucidate the mechanisms of mental diseases, psychiatrists have brought forward a multitude of eventual causes which can be summarized as *psychogenetic* and *organic*. After Delmas' and Boll's recent classification, psychopathic disorders are divided into two groups, which they call *constitutional psychopathies,* and *lesional psychopathies.* The majority of psychiatrists, at least those of the contemporary French school, appear to be satisfied to include the so-called constitutional psychoses in the psychogenetic group, that is, the group in which no definite lesion has been found. They classify under that heading paranoia, moral insanity, pithiatism, manic-depressive psychosis and anxiety neurosis. They call these *constitutional,* because they represent the abnormal development of a constitutional trait, in paranoia, for instance, the pathological hypertrophy of self-consciousness and suspicion.

The lesional psychopathies include two sub-groups. The first is represented by psychopathies with permanent lesions, and, for that reason, is also called the sub-group of organic psychopathies. These are: idiocy, imbecility, feeblemindedness, epilepsy, general paresis, and the dementias. The second sub-group is distinguished from the first by the fact that the lesions are only transitory, and very likely induced by slight toxi-infections. It is chiefly represented by neurasthenia and mental confusion.

Although fairly complete, this classification does not seem to have left any room for the chronic hallucinatory psychoses. On the one hand, these do not necessarily develop because of an inborn distorted constitutional trait, and, on the other, the possibility of their organic etiology has apparently not appealed to the majority. Gaetan de Clérambault, an outstanding figure in the modern French psychiatric world, postulates that the chronic hallucinatory psychoses have a histological substratum that acts as the *primum movens* of the psychosis, and is to be looked for in an alteration of the cortical neurones; the delusional themes have no etiological value and are considered by him as nothing else but an added feature or a secondary construction. At all events, the assumption is worth being studied on account of its affirmation of an organic basis, and also because so long as psychiatry remains on strictly psychogenetic grounds definite progress is very unlikely to ensue.

De Clérambault views all mental diseases, but more especially chronic hallucinatory psychoses, as general diseases, and he assumes for them an organic factor. He considers the phenomena of mental automatism, which will soon be described, as the basal nucleus of all chronic hallucinatory psychoses, and the ideational components as

* Read at the meeting of the Montreal Neuro-Psychiatric Society in January, 1931. From the Neurological Service of the Notre-Dame Hospital.

secondary. According to him, the syndrome of mental automatism is an evidence of organic disturbance; but, before giving his reasons for saying so, let us first describe the elements of the syndrome. The title of mental automatism does not satisfy him entirely, and he suggests that it should remain only as a provisory formula until a more accurate terminology can be found. It is meant to designate a very circumscribed syndrome which is characterized clinically by automatic phenomena of three kinds, namely, *ideoverbal, sensory* and *motor*.

The ideoverbal phenomena are the most important ones. Although it is not a rule, they usually appear before the motor and sensory automatisms. Far from being hostile, their contents are essentially neutral, at least at the beginning; they surprise and even amuse the patient. De Clérambault stresses a great deal the fact that these early phenomena do not embody the characteristics of auditory hallucinations. They are not individualized; they do not refer to any special theme; they produce no evidence of any definite object. True hallucinations would appear much later in the course of the psychosis.

Among the most frequent ideoverbal constructions are the following:—

1. The anticipation of thought. Patients usually refer to it by saying: "They find names before me." "My thoughts are already made before I have time to concentrate."

2. The enunciation of acts. Every act, even if most trivial, is voiced aloud. "She goes to bed." "She takes her bath." "She scratches her back," etc. In the later stages, the acts are not only enunciated but also analyzed and even criticised.

3. The echo of thought. The patient's thoughts are repeated aloud as soon as they are formed.

4. The kinematographic review of memories. Patient sees silent moving pictures of what he has done a long time ago. He cannot stop the film and must pay attention to it until it is over.

5. The substitution of thought. In this instance, the patients usually express themselves as follows: "They make me think of things that I want to discard." "I am afflicted with a double thought."

6. Ideorrhœa. The patients have, at intervals, a continuous flow of thoughts which they cannot stop.

7. False recognitions. They say then: "They force me to recognize people whom I have never seen or known."

It should be added that, besides these phenomena, which can be referred to as positive ideoverbal automatisms, there are several others of a negative nature. They consist of arrest of thought, forced forgetting, absence and stealing of thought.

Later, or sometimes simultaneously, appear the phenomena of sensory automatism, which are known, according to the majority of authors, to be the most important feature in the chronic hallucinatory psychoses. These are too well described in the text-books to enlarge upon them here. They extend from mere noises to the most elaborate conversations. Most of the time they pertain to the auditory sphere, but all senses can be affected by them. Even the visceral sensibility and the genital zone are eventually the seat of sensory automatism. Let us say, however, that in the beginning, sensory automatisms are very often non-verbal, and that before reaching the stage of systematized conversations they vary through a gradual range including noises, assonances, salads of words, and nonsensical sentences.

The motor phenomena, also called kinesthetic hallucinations, are most especially localized upon the vocal musculature. For instance, they say: "When I think, it is as if I had the sensation of speaking," etc. This can go as far as actual verbal impulsions.

Of all these phenomena, the most abstract and elementary ones are to be considered of the utmost importance. They represent what de Clérambault calls "minor automatism," and they usually occur at the very beginning of the psychosis. They are interpreted by him as "a molecular trouble of the elementary thought." Among the symptoms of minor automatism he classifies the purely verbal, non-ideational constructions, such as syllabic hash, salads of words, absurd and nonsensical expressions; he also adds the neutral psychic phenomena referred to as abstract intuitions, arrest of thought, and kinematographic review of memories, usually associated with the early ideoverbal productions, such as enunciation of acts, anticipation and echo of thought.

This ensemble, summarized under the label of minor automatism, occurs as a rule in the initial phase, when developing in a slowly

growing chronic hallucinatory psychosis having a long insidious beginning period. In cases wherein gross lesions are evidenced minor automatism will be replaced from the very onset by true auditory hallucinations. The total absence of systematized themes, together with the automatic-like presentation, seem to indicate that the cause of those early phenomena is to be found in an irritative histological process, taking place very likely in the cortical neurones. During the past, the ideational contents of hallucinations have inclined the majority of psychiatrists to accept a psychogenetic origin, whereas, according to de Clérambault, ideogenism or psychogenism explain nothing but the linking together of the delusional constructions.

The true etiology and mechanism have been greatly enlightened by the phenomena of mental automatism, which, in turn, as de Clérambault advocates, should be considered "en bloc" and assimilated to hallucinations of all kinds, ideoverbal, motor and sensory, thus constituting a triple automatism of the same origin. This triple automatism is the result of actual deterioration, either produced by toxi-infection or traumatism.

If one accepts this reasoning, the classical formula becomes inverted. The prevalent idea of a hallucinatory psychosis is no more its cause or generator but the mere consequence of mental automatism. In other words, mental automatism is the basal nucleus, the ideation being secondary. Of course, this process has nothing in common with the intellectual quality of the subject; it indicates nothing more than a histological insult to the centres. Let us repeat once more the slogan sponsored by de Clérambault's school: mental automatism appears first, the delusional construction being secondarily provoked by it. This organic substratum of chronic hallucinatory psychoses is also rendered more easily understood by the fact that they always end in dementia. Their etiology and prognosis should not be looked for in the intellectual sphere, because the *causes* are not to be found in the intellectual sphere. The superstructure must not be mistaken for the whole.

In his numerous papers on chronic systematized psychoses, de Clérambault asserts that the pure types, such as constitutional psychoses without hallucinations, on the one hand, *e.g.*, paranoia, and, on the other hand, chronic hallucinosis without delirium are extremely rare. One meets rather with a combination of the two essentially consisting of a symbiosis of hallucinations and delusions at various degrees. The syndrome of mental automatism, and more especially the neutral ideoverbal phenomena of the beginning, are the foundation of the forthcoming delusions and terminal dementia. The subsequent delirium, however elaborate and systematized it may become, is a logical consequence of mental automatism. In fact, if one stops to consider, as de Clérambault did, the early phases of chronic hallucinatory psychoses, one will invariably discover the aforesaid phenomena to be represented at that time by the ideoverbal automatisms, chiefly echo of thought and enunciation of acts, and by non-ideational sensory phenomena, such as assonances, salads of words and nonsensical sequences of sentences, all of which are interpreted by the French psychiatrist as "elementary and automatic troubles of the interior speech." Those early phenomena are not yet attributed by the patient to an external origin, but are felt as independent from his own will and reasoning power, and are not recognized as his own.

In reference to this automatic disorder, Heuyer, one of de Clérambault's most enthusiastic disciples, has written the following lines, quoted almost textually: "As it is the brain's intellectual function to produce thoughts, a sick brain will, under certain circumstances, automatically produce a thought that becomes exteriorized and is not anymore recognized by the patient as his own production." In that mechanical and automatic process lies the foundation of all chronic hallucinatory states. It is only after a relatively long period of time, and by natural deduction, that, being unable to attribute the phenomena to himself, the patient will try to solve the riddle by an outside influence. The strangeness of those impressions, as well as their unexpectedness and repetition, are other factors in his looking for an exogenous explanation. By that time, the strange occurrences of the beginning have become an actual voice, a true transmission of thought.

In logical sequence to these assertions, it is

impossible for a delusion, *e.g.*, an idea of persecution, to produce any hallucination, because the delusion is always chronologically posterior. The delusional constructions, also called by de Clérambault the *parasitic themes,* will have different components according to the affective make-up and intellectual tendencies of the subject. For instance, a constitutional paranoid will be transformed by mental automatism into a dangerous, hostile and committable lunatic, whereas the same phenomena will never give rise to similar delusions if the inborn dispositions were of a meek, conciliatory and debonair nature. Such traits would rather announce the forthcoming of a pure hallucinosis without delirium.

If psychogenetic factors are to be eliminated from the genesis of chronic hallucinatory psychoses, one becomes logically inclined to explain the facts by a physico-chemical dysfunction, the efficient cause of which being likely to be found in histological changes of the cortical neurones. Furthermore, as we have said previously, it seems to us that the terminal dementia of most chronic hallucinatory states adds further soundness to the mechanical, automatic and histological theory of hallucinations.

The syndrome that has been described in this paper is essentially a chronic one, leading to dementia. It should be mentioned, nevertheless, that one may find it with all its elements, but most of the time transient and of short duration in other mental diseases wherein a slight and temporary irritation of the cortex has taken place, such as subacute alcoholism. In these instances, the progression is not slow and insidious as in chronic hallucinatory psychoses, but so rapid that it reaches completion in a few days. It vanishes away fairly quickly with the suppression of the occasional factor.

This conception of the chronic hallucinatory psychoses is not only instructive along the lines of etiological mechanisms and diagnosis, but it enables one to pronounce from the very beginning of a psychosis,—after occasional subacute toxi-infectious causes have been eliminated,—a verdict of terminal dementia. It emphasizes the trifling nature of the delusional themes as compared with the capital importance of careful search and survey of the early phenomena.

Case Reports

A CASE OF CHRONIC INTERSTITIAL NEPHRITIS WITH HYPERTENSION AND ALBUMINURIC RETINITIS IN A CHILD*

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A girl of 13 years of age was admitted to the Children's Memorial Hospital in March, 1931, complaining of headache, vomiting, abdominal pain and poor appetite, and with the history of having suffered from "kidney trouble" all winter. These symptoms apparently came on insidiously during September, 1930, and became so severe that she was obliged to leave school and take to her bed. Her urine at that time was found to contain blood and showed other evidence of nephritis. This was the first indication that there was any trouble in the kidneys.

Personal history.—The girl is said to have always been sickly, and had suffered from measles, varicella, pertussis, mumps, diphtheria, and enteritis. She had had her tonsils removed at the age of 3. No suspicion of any trouble in the kidneys ever arose before September, 1930.

Family history.—Irrelevant.

Examination on admission showed a sallow, poorly nourished and under-sized girl. Her height was 50 inches; weight 43½ pounds. (An average girl of 13 is 60 inches tall and weighs 95 lbs.) There was no œdema or puffiness about the eyes. The skin was dry and there was some pigmentation, especially near the axillæ and over the shins. There was no general glandular enlargement and no signs of adolescent development. Her teeth were poor, several being carious and defective. The tonsils had been removed.

The heart was enlarged, especially to the left.

* Read at the ninth annual meeting of the Canadian Society for the Study of Diseases of Children, Lucerne-in-Quebec, June 5, 1931.

There were no murmurs, but the second aortic sound was accentuated. The pulse was 110, of full volume and regular. The arterial wall was palpable. Blood pressure was 230/212. The lungs were negative.

The abdomen was level and soft. There was slight tenderness and rigidity on the right side, especially in the upper quadrant. No masses were felt and no free fluid was made out. The kidneys, liver, and spleen were not palpable.

Nervous system, normal.

No signs of rickets were found, either clinically or by the x-rays. There was a normal degree of genu valgum.

Urinalysis showed a clear, pale urine, 1007, acid, no sugar; albumin ++ (Esbach, 3.3 grm. per litre). A very few red blood cells and granular casts were found.

Blood count: red cells, 3,280,000; white cells, 12,000; hæmoglobin, 40 per cent.

Ophthalmoscopic examination revealed the typical signs of albuminuric retinitis, with large tortuous vessels and white spots, together with swelling of the retina and papilla. No hæmorrhages could be seen.

The Wassermann test was negative; the Mantoux was positive.

EXAMINATION OF THE BLOOD

	April 1	*April 15*	*April 24*
	mg.	mg.	mg.
Urea nitrogen ...	21.00	102.00	204.00
Creatinin	1.68	3.61	3.75
Uric acid	4.54	8.00	10.00

Sugar and chlorides were within normal limits.

MOSENTHAL TEST

April 2, 1931

10 a.m.	52 c.c.	1010
12 "	83 "	1008
2 p.m.	113 "	1006
4 "	51 "	1008
6 "	106 "	1008
8 "	43 "	1006
Total	448 c.c.	Fluctuation, 4 points.

Night urine from 8 p.m. to 8 a.m.; total 564 c.c.; specific gravity 1006.
Total quantity excreted in 24 hours 1012 c.c.

The course of the disease while in the hospital.—The child had little inclination for food or drink. Indeed she seemed afraid of both, owing to the abdominal pain and frequent vomiting from which she suffered. Her headache was severe and almost constant. She dozed a great deal of the time except when suffering pain. Morphine had to be administered on several occasions to give her relief. She was never delirious and only became unconscious towards the end. Hæmaturia occurred from time to time, but the urinalysis was usually similar to that on admission.

For the first 3 weeks her temperature fluctuated between 98° and 100°. During the last week it was always subnormal. She had no frequency of urination and her daily output varied from 200 c.c. to 1,300 c.c., the usual amount being about 600 c.c. per day.

Her bowels moved once daily as a rule and

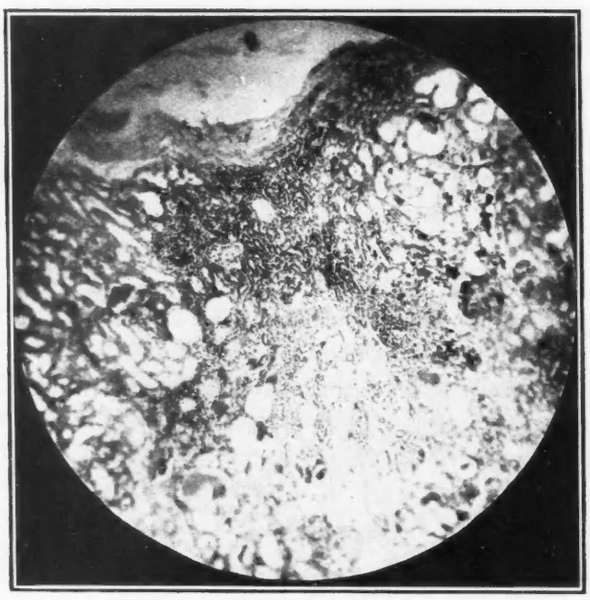

FIG. 1.—Section of kidney. Note area of scar infiltrated with lymphocytes; dilated tubules and casts.

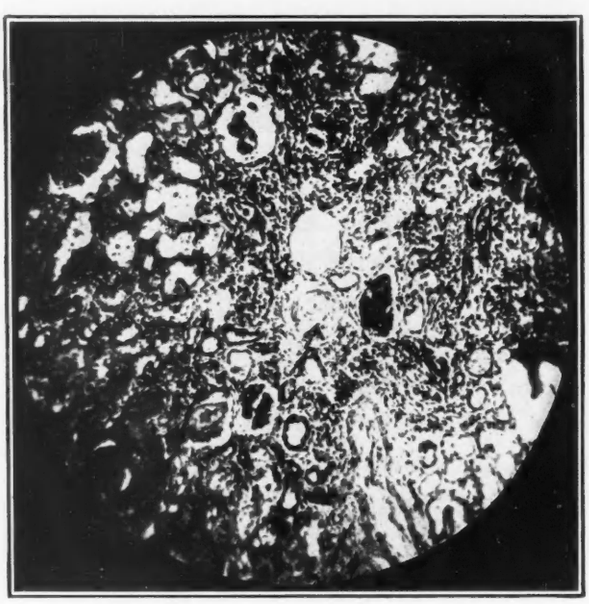

FIG. 2.—Section of kidney. Note increase in connective tissue with scar in centre. At A an almost completely occluded artery.

there was no diarrhœa. Her condition grew steadily worse. Rectal enemas of glucose and saline gave her temporary relief from her symptoms, but she became emaciated and dehydrated. Her blood urea nitrogen rose to 204 milligrams per cent, and she became unconscious and died 4 weeks after admission to the hospital.

Post-mortem examination. — The heart was found to be considerably larger than normal; the left ventricular wall was much thickened. The valves were normal. The right kidney was small and smooth. The capsule stripped easily. Minute hæmorrhages studded the surface of the kidney under the capsule. The pelvis and ureter appeared normal. The left kidney was much contracted, being about half the size of the right. Its capsule was more adherent.

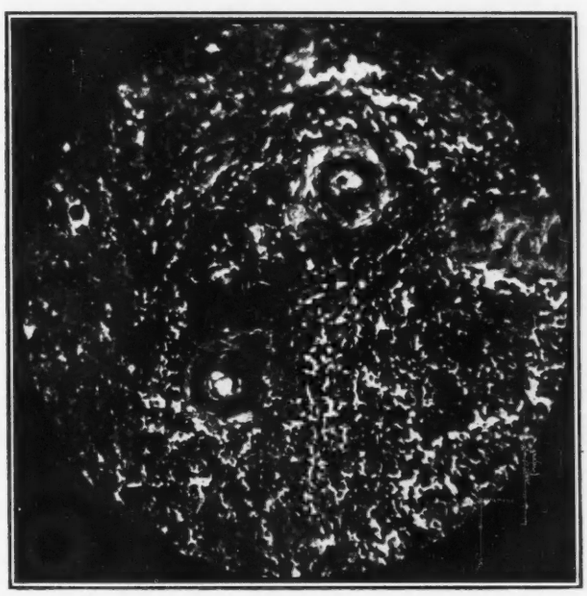

FIG. 3.—Section of spleen. Note two arteries showing marked arteriosclerosis. This shows that the toxic agent, whatever it was, damaged the arterioles in general and not those in the kidney alone.

Both kidneys showed marked diminution in the width of the cortex. In some areas this seemed to be absent, in others only about one-eighth of an inch in width. The cortex and medulla were not clearly demarcated. The cut surface of the kidneys showed pale greyish areas.

Microscopic examination. — The glomerular tufts were shrunken; the Bowman's capsules thickened and fibrotic. The tubules were much dilated. There was thickening of the vessel walls, and a great increase in connective tissue in the interstitial tissues and a lymphocytic infiltration. Sections of the spleen and heart also showed marked arteriosclerosis.

A CASE OF JUVENILE TETANY*

BY LLOYD P. MACHAFFIE, M.D.,

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This was a male child, 12 years of age, whose complaints were cramp-like spasms of hands and feet.

Personal history.—The boy was born at full term, with normal delivery. He was breast fed for 5 months, then given malted milk, and later milk and water. He had no cod liver oil, and orange juice only occasionally. He was late in standing and in walking. The time of the eruption of his teeth was not known. Head-sweating was not recalled. His weight was about normal at one year. He had had convulsions at 9 and 11 months, during the spring; "child-crowing" in later infancy; chicken-pox and measles at 3 or 4 years of age, and occasional bilious attacks and with occasional pains in knees and ankles.

Family history.—The mother and father were both extremely high strung and neurotic; one brother, 17 years of age, well. The mother had had one miscarriage at about 3 months. There was no definite history of convulsions, epilepsy, or nervous disease in immediate relatives.

Present illness.—For 7 years the patient had been having attacks of spasms, principally affecting the hands and feet, although at times the arms, legs, and trunk muscles. These attacks usually occurred in March or April, and in the last two years there had been mild attacks in late September or October. Occasionally there had been some slight transient spasm in mid-winter months, but never in summer. Each spring the attacks were more frequent than they had been in the previous spring. The 1930 attacks lasted two weeks; the 1931 attacks lasted ten weeks; and the patient is at present under treatment.

The attack lasted, as a rule, twenty minutes to one hour. Usually it occurred on awakening in the morning, and was sometimes associated

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with nausea and vomiting. Quite frequently it was ushered in by an aura, *viz.*, peculiar indescribable sensations across the lower abdomen, or a lessened acuity of hearing, voices sounding muffled or distant.

The carpopedal spasm was of typical tetanic nature. Flexion of the forearm on the upper arm was prominent, and the hand assumed the typical "accoucheur position." Sometimes the tongue was spastic and speech difficult, and sometimes there was a very noticeable flickering of the eyelids. In some attacks the whole body was as rigid as a poker. Abdominal cramps had been noticed, but no interference with micturition. Numbness and tingling had not been noted during or before an attack. Pain in the ankles during the attack, and stiffness after the attack, had been noticed. Spasms of the hands lasted intermittently through the day. Severe spasms had occurred in the afternoon, but not often. There had been no loss of consciousness, and the mind had always been bright and clear. After an attack the patient got up and about, and usually had a ravenous appetite.

One year ago the blood calcium was 7 mg. per cent, and blood phosphorus 4.7 mg. per cent. The patient ceased to have attacks on 20 grains of calcium chloride, every four hours, and viosterol 20 mins., three times a day.

All through the fall and winter of 1930, the patient took 45 grains of calcium gluconate per day, and 9 drops of ostogen each day. In spite of this treatment severe attacks began on March 24, 1931.

Physical examination (March, 1931), revealed the following points of interest. Attacks typical and similar to previous attacks. Trousseau's and Chvostek's signs readily elicited. The electrical reactions were not tested. Height 4 ft. 10 in.; weight 71 lbs. Adipose tissue scant. A neurotic, precocious, garrulous child, with keen interest in his own symptoms. Extreme enamel defects of all teeth, with marked ridges and furrows, particularly of the front incisors; also two alveolar abscesses. A few shotty glands in neck; tonsils moderately enlarged and unhealthy looking. The thyroid, not palpable. Heart and lungs, negative . Pulse not rapid. A slightly palpable spleen. Few scattered purpuric spots, slightly raised, 2 to 3 c.m. in diameter, on both shins. Knee jerks active. No ataxia. The pupils were equal and active. Coarse tremor of eyelids at times. The pharyngeal reflex was present. Urine: faint traces of albumin; specific gravity 1008; no casts. The amount secreted was 2000 c.c. (on one examination). The blood showed slight secondary anæmia; 80 per cent hæmoglobin; red blood cells 4,800,000; white blood cells 9,400. Blood pressure 105/65. The Wassermann and intracutaneous tuberculin tests were negative. Phenolsulphonphthalein test: kidney secretion, 32 per cent, first hour; 12 per cent, second hour.

Mosenthal test for kidney function: the specific gravity ranged from 1001 to 1006; one specimen 1008. Night specimens, 1003-1002-1001, showing marked inability to concentrate. The amount voided was 1628 c.c. The boy complained greatly of thirst during the test, although fluids given with meals.

Blood phosphorus, 3 mg. per cent; blood calcium, 7 mg. per cent; blood urea, 10 mg. per cent; creatinin, 0.9 mg. per cent.

FIG. 1

X-ray: thymus showed no enlargement. Long bones; diaphysis and epiphysis normal for age. No evidence of thinning or thickening of bones. Gastro-intestinal tract. Stomach of about normal size; emptied in 4 hours. Transverse colon low, no stasis. Skull showed a normal-sized well defined sella turcica.

Stools: normal in form.

Eyes: normal.

The fact that the patient was unable to concentrate urine led us to test out his water intake. He was given a pad and pencil and told to jot down the amount of all fluid taken per day. We were surprised to find that over 5010

c.c. were taken during the day, and that he greatly relished drinking water, ginger ale, etc. His output was 4400 c.c. A moderate amount of drinking was done at night if awake, but as a rule, patient slept from 10 p.m. until 6 a.m.

Treatment was instituted for tetany, as follows. (1) Calcium chloride, gr. xx, every four hours during the day. (2) Viosterol, 20 minims, three times daily. (3) Parathormone every day or every other day, according to blood calcium and symptoms. (4) Buttermilk substituted for sweet milk. (5) Quartz lamp daily. (6) Carious teeth with infected roots extracted. (7) Tonsils removed.

The patient was given 100 units of parathormone at first, and thereafter 20 to 40 units every day or every other day. In 5 days the blood calcium reached 11 mg. per cent, and the blood phosphorus, 3.6 mg. per cent. In 10 days the blood phosphorus was 4.5 mg. per cent, and in 14 days, 5.1 mg. per cent. In a neurotic excitable child the frequent taking of blood was difficult. However this was done every 2 to 4 days.

Definite and marked improvement occurred as a result of treatment. The patient became less neurotic; there was improvement in general well being, and a gain in weight. The spasms became infrequent 10 days after the beginning of treatment. On one day when the blood calcium was 11 mg. per cent, and the blood phosphorus 4.5 mg. per cent, the patient was about to be discharged from hospital, when fairly severe carpopedal spasms and marked nervousness developed. On another occasion, after discharge from the hospital, the blood calcium was found to be 8 mg. per cent, and the patient said he never felt better. Three days later it was 10 mg. per cent, and a mild spasm occurred. Chvostek's sign was always very marked on the days when spasms occurred, and very slight or absent on other days. It was a definite guide to treatment.

At present the patient is taking, in addition to calcium chloride and viosterol, 3 teaspoonfuls of cod liver oil per day. Parathoromone, 30 units, is being given every other day, being watched for cumulative effect. The patient feels well, has at times slight Chvostek's, but no Trousseau's sign. His weight is 81 pounds, and his appetite good.

The diagnosis is juvenile tetany, erythema nodosum, and possibly, incipient diabetes insipidus.

The points of particular interest are:—

1. The interval from 14 months to 5 years of age when no symptoms were present.

2. The suggestive association of hypofunction of the parathyroid and of the posterior portion of the pituitary, and the possibility of toxic absorption from the tonsils, and teeth having a depressing influence on the function of these endocrine glands.

3. The discrepancies between laboratory and clinical findings, (the high blood calcium with symptoms, the low blood calcium without symptoms), which observations confirm the findings of Liu that tetany may exist when the total blood calcium is 9.0 mg. per cent, and latent tetany when it is 10.2 mg. per cent, and which would indicate the advisability of estimating the diffusible or ionic fraction of calcium as well as the non-diffusible; alternations in the former only having a bearing on production of tetany, as pointed out by Gunther and Greenberg[1] in recent experiments.

4. (a) The evidence of rickets in infancy. (b) The seasonal predilection. (c) More frequent and severe attacks than ever before this spring, in spite of calcium and viosterol all winter. (d) The unusual aura before attacks. (e) Extreme enamel defects indicating defective calcium metabolism.

This patient is, of course, still under treatment and observation.

REFERENCE

1. GUNTHER AND GREENBERG, *Arch. Int. Med.*, 1931, 47: 660.

A CASE OF ACUTE YELLOW ATROPHY

BY E. P. SCARLETT, M.B. AND
W. A. LINCOLN, M.D., F.R.C.S. (ENG.),
Calgary

The form of icterus gravis to which the term acute yellow atrophy is applied is a relatively rare condition. Its clinical recognition is seldom possible except in the presence of the classical picture of a rapidly fatal illness characterized by jaundice, coma, and reduction in the size of the liver.

CASE REPORT

S.H., a farmer's wife, aged 46, was admitted to hospital on October 21, 1931, with a com-

plaint of jaundice and general malaise. She had been perfectly well until ten days previously, when there appeared suddenly flatulence, nausea, and vomiting. Three days later she noticed jaundice, which became rapidly more intense. The appetite was good. There was no pain. The stools had been clay-coloured on some occasions and normal on others. The urine had been highly coloured.

There was nothing of note in the past history; no previous indigestion and no loss of weight. She had used no drug of any description. The menstrual periods were normal.

On examination the patient was found to be deeply icteric. She was of robust constitution, but looked ill. The tongue was heavily furred. The lungs were clear. The heart was enlarged to the left and the cardiac mechanism was normal. The blood pressure was 124 systolic and 68 diastolic. The peripheral vessels were not thickened. The abdomen was slightly distended and tympanitic. On account of the moderate tympanites the determination of liver dullness was difficult. Neither the liver nor the spleen could be palpated. There were no abdominal masses and no ascites. There was a dark red discoloration of the dorsum of both hands and forearms which, in conjunction with the icteric staining of the skin, resembled the early dermatitis of pellagra. The patient and her husband, however, maintained that this "sunburned" appearance of the arms had been present for years.

The red blood count was 5,152,00 per c.mm.; the hæmoglobin 85 per cent; the white blood count 13,400; with polymorphonuclears 78 per cent, lymphocytes 20 per cent, large mononuclears, 2 per cent. Urinalysis showed a faint trace of albumin, a few granular casts, and urobilin. There were no leucin or tyrosine crystals. The blood Wassermann test was negative. A qualitative van den Bergh test gave an immediate direct reaction. The icterus index was 200. The non-protein nitrogen of the blood was 42.3 mg. per hundred cubic centimetres; the blood creatinin 1.7 mg. per hundred cubic centimetres.

On admission the temperature was normal and the pulse 100. The patient was mentally clear and able to detail the history accurately. The following day she became drowsy and rapidly passed into coma, which was continuous until death.

There was no delirium at any time. The urinary output was fairly well maintained, the patient being catheterized regularly. Vomiting occurred four or five times a day. The temperature increased to the terminal level of 102°; the pulse gradually rose to 130. Death occurred on October 25th, the fourth day after admission. The condition was diagnosed as acute yellow atrophy of the liver.

Post-mortem examination. — The liver was found lying well back toward the spinal column. It was about one-third of the normal size, and weighed 870 grams. The reduction in size was uniform. The capsule was wrinkled and the consistency softer than normal, although still retaining some elasticity. On section the central portion was a bright yellow colour and the outer zone a mottled yellowish-red, with areas of dense red tissue of varying size and shape. The spleen was soft but not enlarged. No hæmorrhages were noted in the skin or any of the viscera.

Histologically, there was complete parenchymatous destruction, sections showing massive necrosis of the liver tissue. There were trabeculated areas of necrosis in which practically every liver cell had disappeared, the bile ducts, the fibrous stroma, and a few shadowy outlines of cells alone remaining. The few remaining islands of liver tissue were composed of degenerating vacuolated cells showing fatty metamorphosis. A few areas showed particles of inspissated bile pigment. There was no evidence of regenerative hyperplasia in any of the sections. The amount of degeneration was so great that the tissue stained poorly, making it impossible to secure good microphotographs.

COMMENT

The condition occurred in a woman who had been in perfectly good health. The etiology is entirely obscure. Neither the history nor the post-mortem examination offers any clue to the possible cause of the disturbance. The patient had not used any of the cincophen group of drugs which may give rise to lesions of this character. The first stage of the illness, with gastrointestinal symptoms, malaise, and icterus, followed the usual course, but the later stage was extremely rapid, the period of coma lasting only forty-eight hours. The degree of hepatic

insufficiency was so extreme that it apparently precluded the development of hæmorrhagic phenomena and of symptoms of nervous irritability. The clinical course is in keeping with the character of the lesion of the liver, which showed intense widespread necrosis.

A case of this type would seem to indicate the fact that the term acute yellow atrophy may still properly be applied to a distinct disease of the liver of unknown etiology, with a fairly typical clinical course and with a pathological picture not duplicated by any known intoxication.

We are indebted to Prof. J. J. Ower, of the University of Alberta, who studied the pathological sections in this case.

Clinical and Laboratory Notes

THE ALLEGED INCREASE IN PLASMA FATS AFTER THE INJECTION OF EPINEPHRINE*

BY C. N. H. LONG AND ELEANOR M. VENNING,
Montreal

(PRELIMINARY NOTE)

Himwich and his various co-workers have recently published experiments in which they claim there is an increase in plasma fats following the injection of epinephrine. In addition they claim that such procedures as are known to be associated with the liberation of epinephrine within the body also led to increases in plasma fats. Included among these are emotional excitement, nocuous stimulation and the stimulation of sensory nerves.

The authors of the present note have been able to show that these apparent increases in plasma fats are due to another cause. All the above mentioned procedures are well known to lead to increases in blood glucose and it is the conversion of glucose into lactic and other organic acids during the technical procedures employed in the estimation of the fats that is responsible for the observed increases in plasma fats.

By the use of a method which is free from the above objection the authors have shown that the procedures outlined above have little or no effect on the fat content of the plasma.

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4. KOSKOFF AND DUSSER DE BARENNE, *Science*, 1931, **74**: 550.

A DEVICE FOR PREVENTING GLARE IN ELECTRIC OPHTHALMOSCOPES

BY N. BISHOP HARMAN, F.R.C.S.
London

The introduction of the electric ophthalmoscope has greatly increased facilities for the examination of the interior of the eye, but the internal position of the source of the illumination within the instrument has produced certain new difficulties which the older reflecting ophthalmoscope did not possess. The electric lamp within the stem of the electric ophthalmoscope throws a beam of light parallel to the instrument, and this beam must be bent at right angles to enter the eye of the patient. Prisms and mirrors of various designs have been used to effect this bending. The desideratum is such a complete bending of the rays of light into the eye of the patient that the surgeon has a clear peep-hole through the instrument along the beam of light, and free from all disturbance such as will be caused by rays of light that may be diverted backwards from the instrument so as to reach his own eye. If there are such aberrant rays the surgeon cannot see the fundus clearly by reason of the haze that is caused by the rays. The effect is somewhat similar to that disturbance to visibility produced by the rays of the head lamps of a car when there is a slight mist at night. These disturbing effects have become more evident with the increase in the power of the light available.

The aberrant rays are brought about by several conditions. If a glass mirror with a drilled hole be used in the ophthalmoscope the beam of light will impinge upon the upper edge of this hole, and, no matter how it may be blackened, this edge will scatter a blaze of disturbing light. If the mirror has no drilled hole but only a gap in the silvering, the hinder surface of the glass itself will reflect any light that may fall upon it from above the ophthalmoscope, and the slightest imperfection in the glass or dust upon it will increase the disturbance.

To overcome this defect, Marple cut out the upper edge of the mirror and used one of U shape. It was very successful, but the mirror was too fragile. A polished stainless steel mirror of U shape was substituted, and this has two drawbacks, in that it has a lower reflecting power and soon scratches, still further reducing the amount of light reflected. Prisms, such as were used in the first ophthalmoscopes, avoided some of the difficulties, but if they are well designed they are costly and permit very little variation of the beam, while the inexpensive ones are inefficient.

Recently, in discussing electric ophthalmoscopes with Mr. J. W. Tudor Thomas, of Cardiff,

* Abstract of a paper read at the Montreal Physiological Society, February 25, 1932.

he told me that there had come into his possession an instrument, the origin of which he did not know, which was free from these defects. A

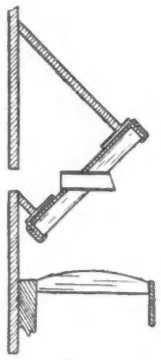

FIG. 1.—Section with mirror fitted with glare shield.

small tube had been fitted into the drilled hole of the glass mirror. This device is the simplest, most natural and effective correction of the one difficulty of the electric ophthalmoscope. It does exactly what we instinctively do to protect our eyes from glare. We shield them with our hands, or with hat-brims, or we fit vizors to the wind screens of our cars.

A small thin-walled tube is mounted within the hole of the mirror of the ophthalmoscope, the forward end of the tube is cut at an angle so that there projects from the hole of the mirror a crescentic ledge or shield. This shield fits the lower edge of the drilled hole and projects just sufficiently to cast a shadow over the hole. When the shield is in position no aberrant rays can be diverted into the surgeon's eye and he gets a perfectly clear view into the patient's eye. For a mirror set at an angle of 45° to the beam from the lamp and a hole of 2 mm. diameter, the shield fitted to the lower edge of the hole must project 2.5 mm. to provide complete protection. The shield is made of metal and is fitted to the metal bed-plate of the mirror, but is independent of the mirror glass, so that it is secure and not likely to be broken. Also the mirror glass can be detached without disturbing the metal shield.

One small difficulty arose in the use of the device. When the beam from the lamp was exactly centred to the mirror, it was found that the shield cut out the focussed rays when they met at the position of the shield. This difficulty was overcome by slightly decentering the lamp, so that the beam when exactly focussed on the mirror impinged upon it to one side of the drilled hole. This decentering has no drawback. Messrs. Rayner and Keeler Ltd., of New Bond Street, have fitted this shield to the new electric ophthalmoscope made by them for me and which was described in the *Canadian Medical Association Journal* in March. The device is a real advantage, and it will be the standard pattern. It has been fitted to other instruments and has effected a great improvement in each case.

CANCER AND MAGNESIUM DEFICIENCY.—P. Delbet points out that, from its action on the nervous, digestive, and other systems, magnesium is evidently necessary for the human organism, and that this salt is deficient in certain of the present-day foods, such as bread. As it has been shown that magnesium possesses an anti-cancerigenic action, Delbet advances the hypothesis that the existing increase in cancer may in part be due to a deficient intake of this substance. Lamarre has proved that the coarser salt in common use twenty to thirty years ago contained 1.7 per cent of magnesium, while the refined varieties now employed contain only 0.35 to 0.45 per cent—an annual diminution for each person of 40 to 50 grams. Breteau has noted that coarse flour contains 62 mg. of magnesium per 100 grams, and the fine flour used in baking only 8 to 11 mg., while the discarded bran contains 70 to 116 mg. Perhaps a greater cause of magnesium deficiency is the progress of agriculture. All plants contain magnesium, which is utilized for the synthesis of chlorophyll and for reproduction. So each harvest depletes the soil of this salt; a crop of sugar beet, for instance, removing about 90 lb. per acre. Moreover, this loss is not replenished by the use of magnesium fertilizers as other deficiencies are by the employment of nitrites and potassium. Delbet states that all cerebral work causes an elimination of magnesium by the kidneys; he considers that the stress of modern life causes a greater consumption of the salt by the nervous system than formerly, and, therefore, that an addition of magnesium to the food is advisable, especially for those of middle age. If these different causes of magnesium deficiency were eliminated, he maintains that the incidence of cancer would be notably diminished. A. Kotzareff, J. de Morsier, and A. Morin (*ibid.*, p. 11) confirm Delbet's deductions as to the effect of magnesium on cancer cells, and record the results of experiments on white mice engrafted with cancer. About half of these were given, every morning, a 4 per cent solution of the salt with their food. It was found that this modified the evolution of the graft, but to a lesser degree than when injected subcutaneously. Intra-tumoral necrosis, with great liquid infiltration of the whole tumour and sometimes cystic formation, was very marked in the magnesium mice. Though not influencing the survival of the latter, it clearly prolonged life when given to mice that already had tumours.—*Bull. de l'Acad. de Méd.*, July 2, 1929, p. 4.

Editorial

Dr. A. D. Blackader

JUST as the *Journal* was finally going to press the sad news was received that Doctor Blackader, the Editor-emeritus, had passed to his rest. Despite a painful and distressing ailment, which he bore with courage and resignation, Doctor Blackader maintained an active interest in his customary vocations until just before the end, and, indeed, died practically in harness as he would have wished. Thus has been removed from our midst one of the outstanding personalities of our profession. The debt which the Canadian Medical Association owes to Doctor Blackader will readily be admitted by all. Through his prevision, his sense of fitness, his tact, and his fostering care the *Journal* of the Association, beginning in small things, has developed into a worthy exponent of Canadian medical science and a powerful agent looking toward the consolidation of our professional interests. Not only so, but inasmuch as our Association was affiliated with the British Medical Association, and in virtue of our traditions, Doctor Blackader was always keen to strengthen the bonds of Empire, so far as he could by his word and pen, and by, from time to time, inviting distinguished members of the profession from Britain to contribute to our pages. His hope was to see the *Journal* imperial as well as national. Although retired from the active conduct of the *Journal* for the past two years Doctor Blackader continued to take a keen interest in its welfare and frequently wrote for its columns. The Editorial Board mourns the loss of one who was a wise counsellor, a sympathetic colleague, and a genial friend. At the funeral service which took place in St. George's Church on March the sixteenth the Canadian Medical Association was represented officially by Dr. Alexander Primrose, the President-elect, and by Dr. A. T. Bazin, the Chairman of Council. A large concourse representing McGill University, the various hospitals and public bodies of Montreal, as well as citizens and friends generally also attended. Next month it is our hope to deal with this sad event in a more worthy fashion.

THE MECHANISM OF HYPERTHYROIDISM

IN the investigation of problems relating to spontaneous hyperthyroidism in man, two distinct questions present themselves. The first has to do with the *cause* of exophthalmic goitre and of adenoma with hyperthyroidism in the human being; the second deals with the *mechanism* of hyperthyroidism, or, in other words, with the process by means of which an excess of the thyroid hormone produces its effect on the animal organism. Despite a growing body of suggestive facts, these questions remain unanswered.

There is still considerable doubt concerning the part that hyperthyroidism plays in the clinical pictures of exophthalmic goitre and of adenoma with hyperthyroidism. The view has been held in some quarters that the

two diseases represent the reaction of different individuals to a state of pure hyperthyroidism, while other authorities have held, at least in the case of exophthalmic goitre, that the thyroid gland is totally deranged and manufactures a perverted secretion. There is some suggestive evidence, indeed, that points to the adrenal glands as playing an important part in the picture. Whatever the ultimate explanation, there would seem to be little doubt that hyperthyroidism contributes a large part to the sum total of signs and symptoms in these diseases.

A variety of causes have made difficult the investigation of the mechanism of hyperthyroidism. Prior to the isolation of thyroxine by Kendall in 1915 the available products of the thyroid gland were of a highly complex nature and contained many impurities which in acute experiments were responsible for striking but non-specific results. Since the advent of crystalline thyroxine and its brilliant synthesis by Harington in 1926, ample quantities of the pure product have been available to workers in the field, and subsequent experiments have shown that many of the earlier results, notably those of Asher, Flack, Oswald and von Cyon, were due to impurities incorporated with the materials used. A further difficulty has lain in the considerable latent period that follows the administration of thyroid products, during which no evidence of hyperthyroidism makes its appearance. Thus, upon injection of an adequate amount of thyroxine little evidence of any effect appears until some twenty-four or forty-eight hours have elapsed. Furthermore there has been no convincing evidence that thyroxine can exert its specific effects on isolated organs or tissues *in vitro* and it is seen therefore that the most productive form of experimentation with active substances is not applicable, that is the addition of the subject under investigation to an isolated tissue. It is possible, indeed, that thyroxine may only be able to exert its specific activity through the agency of the intact organism. In view of the above factors it is obvious that investigations must proceed from the starting point of the intact thyrotoxic organism. Evidence derived from this source has been accumulating for a number of years and is most suggestive in its implications.

The most striking features of hyperthyroidism, whether spontaneous or artificially induced by thyroid products, are increased heat production, increased consumption of oxygen and production of carbon dioxide, nervous instability, tachycardia, tachypnœa, rapid loss of weight and the production of a negative nitrogen balance. These changes have been variously attributed to (1) "nervousness" and an increased activity of central nervous origin; (2) stimulation of the heat-regulating centre with a consequent elevation of all metabolic process; (3) stimulation of the adrenal glands with a resulting increase in the output of adrenalin; (4) the direct action of thyroxine or one of its products upon the metabolic processes of the tissue cells.

With the development of accurate methods for the measurement of oxygen consumption of animals and human beings it became evident that the increase of metabolic rate in hyperthyroidism could not be attributed to stimuli of central nervous system origin. During complete anæsthesia, and following removal of all chains of the autonomic nervous system and section of all peripheral nerves, the high rate of oxygen usage was found to persist in hyperthyroid animals. Similarly there was no lowering of the metabolic rate when the nervous connections of the adrenal glands were destroyed.

In the past few years more direct evidence of the action of thyroxine has been obtained by a number of workers who have studied tissues removed from hyperthyroid animals. These studies, which have been made according to the volumetric methods developed by Warburg, indicate that there is an increase in the oxygen consumption of tissues isolated from hyperthyroid animals. In 1924, Rohrer, using the Krogh microrespirometer, described increases of oxygen consumption of from 15 to 24 per cent in certain tissues removed from hyperthyroid mice. Similarly Foster (1927) and Dye and Maugham (1927) demonstrated a decrease in the oxygen usage of skeletal muscle from cretin animals, and Dresel (1929) showed a great increase in the respiration of liver and kidney cells from hyperthyroid animals. Although Anselmino, Eichler and Schossman

have failed to confirm these findings, the balance of evidence suggests that an increased rate of metabolism persists for some time in the isolated cells of hyperthyroid animals.

Further evidence of the peripheral action of thyroxine has been obtained from studies made in the Cardiographic Laboratory of the Johns Hopkins Hospital. In 1927, J. K. Lewis made the interesting observation that the accelerated heart-rate that is observed in hyperthyroid animals persists without abatement for many hours when the organ is completely isolated from the body and perfused by Langendorff's method. Yater, (1931) has confirmed this finding, and has shown that in such preparations the ventricle also has an inherent rhythm that is faster than normal when the bundle of His is sectioned. This point demonstrates that the tachycardia of hyperthyroidism is not due to the action of thyroxine on the pace-maker in the heart. Markowitz and his collaborators have extended these observations by a series of ingenious experiments. An animal was operated upon and all nerve paths to the heart were cut. Following an interval, during which the nerves had presumably degenerated, the animal was sacrificed, its beating heart removed and grafted to a second normal animal. Thyroxine was then administered to the latter animal and after several days a significant increase in rate appeared in the engrafted heart. If this work is confirmed it would appear to demonstrate that thyroxine has a direct action on the muscle cells in the heart.

The problem does not end at this point, however, and the fascinating conception has developed that the increased use of oxygen in hyperthyroidism is but a compensatory mechanism and that the ultimate action of thyroxine lies in some more fundamental process of the cell economy. Good evidence has been brought forward to show that the most important phenomenon in hyperthyroidism may be a great enhancement of anærobic glycolysis in the cell with a resulting increase in lactic acid formation. The increase of oxygen consumption could then be looked upon as a result rather than a cause, the tissue requiring more oxygen to burn or resynthesize the lactic acid. Evidence to support such a conception has been brought forward within the past few years by Anselmino, Dresel, Koenig and Adler and Lipschitz. Their experiments, although based largely on well known methods involving reduction of dinitrobenzol and methylene blue, require further confirmation.

In the light of the newer work, some of which requires more convincing proof, thyroxine can be looked upon as stimulating, either by itself or through some disintegration product, the metabolism of the individual cell. It would appear that an acceleration of the fundamental process of anoxybiotic glycolysis results, and that the increased rate of oxygen use is a secondary phenomenon. If this conception proves to be true, an entirely new and promising field presents itself for the investigation of hyperthyroidism and its ultimate mechanism.

DONALD MCEACHERN

TUBERCULOSIS AMONG NURSES

SOME two years ago we published a paper by Dr. E. L. Ross,[1] of Ninette, Man., in which, with admirable force, he discussed the risks of tuberculosis incurred by nurses training in general hospitals. He showed that the number of nurses amongst his sanatorium patients was out of all proportion to the women of the Province generally, or to any other class of women in the Province. These nurses had, with very few exceptions, broken down during their training in general hospitals or in the first year afterwards, and it was implied that this was because precautions had not been taken to protect them from the tuberculous infection to which their work exposed them. It is interesting to note the confirmatory evidence adduced by Dr. Johannes Heimbeck, of Oslo, Norway.[1] For some years he has been collecting facts regarding tuberculous infection amongst nurses in training in this hospital. His observations were

1. Ross, *Canad. M. Ass. J.*, 1930, **22**: 347.

1. Heimbeck, *Arch. Int. Med.*, 1928, March, 336, and 1931, June, 901.

made in a large municipal hospital of 1,500 beds, 300 of which were for tuberculous patients, some of whom, however, were scattered through the general wards of the hospital. As he remarks, the conditions were ideal for the study. On the one hand, there was uniform material, consisting of healthy persons of the same age —the nurses in training. On the other hand, there was a constant and plentiful supply of sources of tuberculous infection, and a period of exposure (the three years of training) in which careful watch could be kept on those exposed.

His observations showed that the nurses who started their training with a negative von Pirquet reaction (this test being part of their initial examination) ran a far greater chance of developing tuberculosis than those who had a positive reaction. The comparison between the two groups is striking. From the year 1924 to 1931, a total of 581 nurses (20 to 25 years of age) passed through the hospital school: 282 of these had positive tuberculin reactions on entering training, and 3 developed tuberculosis; 299 gave negative reactions, and 67 of these developed tuberculosis. All these nurses lived and worked under the same conditions; they were all in good health, and were of the same age and social standing, but according to the von Pirquet reaction they fell into two definite groups.

The association, therefore, between a previous tuberculous infection, as indicated by a positive reaction to tuberculin, and a certain degree of immunity was well established. This is no new conclusion, of course, and the evidence in its favour is overwhelming. But how to bring about a tuberculous infection which shall be enough to set up an immunity and no more (the process which in a haphazard way goes on in most people) is quite another matter. Calmette and his supporters believe that the B.C.G. vaccine will solve the difficulty. This vaccine is an attenuated culture of living tubercle bacilli which, it is claimed, gives rise to a mild tuberculous infection. But opinion is still divided as to its merits, to say nothing of its possibilities for harm. However, Dr. Heimbeck has chosen it as a method of protecting his nurses, and his results so far have been encouraging. He gives the vaccine by subcutaneous injection, rather than by mouth, as is done in the case of infants. Cold abscesses occurred at first, but by reducing the dose to 0.05 mgrm. these were obviated. In most instances a von Pirquet reaction developed, but what is more significant is that those receiving the B.C.G. have shown a greater resistance to the hospital tuberculous infection than those nurses who have refused to be immunized. In the last four years there have been only 3 cases of tuberculosis amongst 160 vaccinated nurses, against 15 amongst 35 unvaccinated. The von Pirquet reaction did not become positive in every instance, but even in these it was felt that some measure of protection was established.

It is admitted, however, that it is too soon to judge of the permanency of the protection produced by B.C.G. In the meantime, there are other methods which may be adopted for protecting nurses against tuberculosis. Dr. Ross made some excellent suggestions which should be reiterated. Nurses on entering training should have a complete physical examination, and well-taken and well-interpreted x-ray plates of the chest; they should be given definite and ample teaching about tuberculosis and the routine for tuberculous patients, and, particularly, the dangers of unguarded coughing; *all* patients in a general hospital should be examined for tuberculosis. The most dangerous source of infection is the patient with an active pulmonary lesion which is overlooked in the presence of some more immediate condition, such as a surgical emergency. As Dr. Ross points out, it is very rare for sanatorium nurses to break down with tuberculosis, the obvious reason being that although they are in the midst of infection, the chance of their developing the disease can be almost entirely nullified by intelligent precaution.

A resolution bearing on this important matter has been kindly sent us by Dr. R. E. Wodehouse, of Ottawa, Secretary of the Canadian Tuberculosis Association. From the following extract it will be seen that the tuberculosis experts of Canada are not unmindful of the situation.

"We are strongly of the opinion that in all general hospitals all kinds of patients on admission should have an examination of sputum for tubercle bacilli as much a routine as examination of the urine, and that, if possible,

a single x-ray chest plate should be made of all patients admitted.

"These measures we consider necessary because tuberculosis is not infrequently an uncomplained-of, unrecognized, and undiagnosed background to more active disease, and as such is a dangerous source of infection, especially to young pupil nurses.

"We further recommend the routine examination of pupil nurses at the beginning of their training in general hospitals, and as necessary during their training, the examination to include tuberculin tests and stereo x-ray plates.

"This routine might very well be applied to medical internes also."

H.E.M.

NURSING EDUCATION IN CANADA

NURSING education is important, not only to the nursing and medical professions but to the general public of whom a very large percentage require nursing service from time to time. It is, therefore, a matter of general satisfaction that nursing education in Canada has been subjected to a survey. The nursing profession are to be congratulated upon their courage in having subjected themselves to a searching analysis. Their sincerity in seeking to learn the truth and to discover means for the correction of defects in the situation is evidenced by their having contributed by far the larger share of the cost of the survey.

The Survey, which is reviewed more fully in another part of this issue of the *Journal*, under "Special Articles," viewed nursing education in the broadest sense, so that it begins with the selection of pupil nurses, their training, the economics of nursing practice in various fields, and then passes to consider how the patient requiring her services and the nurse may be brought together. The Survey has collected the facts to substantiate or to dissipate general impressions. It does establish that standards of admission are, in some training-schools, too low, or that they are not enforced, with the result that the levels of intelligence and education are, to say the least, rather shocking. Bearing this in mind, together with another established fact that many schools are schools without teachers in that they have no full-time instructors, it may seem rather superfluous to have collected and tabulated the opinions of nurses and doctors as to whether there was too much or too little theory in this or that subject. Quality of instruction is vastly more important than hours of instruction, and no matter how many hours are given, if qualified instructors are not in charge, the result will be unsatisfactory. It might also be added that, if the nurse is fatigued by long hours of duty, instruction is largely wasted.

The value of opinions expressed without any standard upon which to base them will doubtless be questioned. How many doctors know, as a standard for purposes of comparison, the intelligence of the average elementary school teacher? It is beside the point, but it would be interesting to have comparable opinions by the nurses on the doctors' intelligence, tact, etc. No matter how much such opinions may be deprecated, there is presented a body of factual material which justifies the work of the Survey and which is sufficient to warrant the recommendations made.

The economic situation of the average nurse is alarming. It is hopeless to expect that any profession will attract and hold any large percentage of intelligent men or women unless it offers a reasonable financial recompense. The present system is obviously unsatisfactory to the nurses and to the public. Irregular employment breaks morale and raises the cost of service. The Survey looks into the future and visualizes the nurse regularly engaged and receiving an adequate income, this being made possible by the spreading of costs in one of several ways. It seems that nursing must be sufficiently socialized that those who require nursing service may receive such service when they require it.

The volume of the Survey is added to by rather full explanations of intelligence tests, methods of teaching, examination systems and other such subjects. The Survey evidently considered it desirable to take the opportunity of discussing these subjects. It also deals a body blow at some pet phrases, such as, "A little knowledge is a dangerous thing," and stresses that intelligence and education are nor incompatible with kindness and consideration.

As is to be expected in a report covering

so wide a field there are statements made which will be questioned. The sterilization of morons is not, as far as we know, advocated by responsible authorities as an effective method of combating disease. The value of the sterilization of the feeble-minded, on any wide scale, is even questioned. As health is not mentioned in the British North America Act it is hardly correct to say that health is primarily a matter of provincial jurisdiction.

The value of the Survey will doubtless lie in the stimulation it will provide. It is most helpful to have this report as a basis of discussion. Some years from now, Professor Weir and the Joint Study Committee will know that their effort marked an historical event in nursing education, because it seems impossible that it should do otherwise than lead to many reforms, the need for which the Survey has laid bare.

G.F.

Editorial Comments

A Provincial Hospital Commission

The recent proposal of Doctor Boucher, Director of the Health Department of Montreal, that a Provincial Hospital Commission be established is creating considerable interest in hospital circles and in the press. This report was prepared in considering the advisability of granting the civic subsidies requested by various city hospitals and charitable institutions. Doctor Boucher laid bare a very vital defect in our hospital system when he reported that "certain kinds of institutions may be increased beyond reason, while certain others which are of a more deserving and urgent nature might not receive a sufficient grant and might be moreover totally neglected. Among the latter, I may mention homes for paralytics and for epileptics, sanatoria for pulmonary and bone tuberculosis, asylums for infants and hospitals for children, etc."

There is no attempt in the report to disparage the petition of any of the worthy institutions requesting assistance to carry on their excellent work or to expand their overtaxed facilities. Montreal can well be proud of the excellent hospitals serving its people. But the recommendation "That the creation or the enlargement of institutions should be decided upon only after the adoption of a plan, prepared so as to meet the demand and to prevent too large an expansion where it is not urgent" can be applied to most large communities in Canada. In altogether too many communities we have a surplus of general public beds and not sufficient accommodation for the groups mentioned by Doctor Boucher, or, it might be added, for convalescents, for the incurable, for acute venereal cases, for alcoholic or drug addicts, or for patients suffering from communicable diseases.

To meet this situation the Director recommends a Provincial Hospital Commission which would consider the advisability of erecting new hospitals or enlarging existing ones and which would specify the amount of municipal contribution and indicate the source of income for such contribution. This Commission should be provincial in nature, for while the report favours the present equal division of indigent responsibility between the municipalities and the province, and would permit municipalities to contribute to hospital foundation or enlargement, the Director is of the opinion that special subsidies should be granted only by the government, inasmuch as the facilities of the large hospital are available to the whole province. This, of course, represents the viewpoint of the large municipality and brings up a point frequently discussed in connection with the local support of orthopædic or pædiatric hospitals serving patients for hundreds of miles, or of provincial general hospitals as in Nova Scotia.

In most provinces at the present time there is some measure of control by the provincial authorities, first by the provincial architect, and then by the Department concerned in recognizing or not the new hospital as a public hospital entitled to indigent grants, but this at best affords a very incomplete and but negative jurisdiction. Many provinces have an inspector of hospitals, a few have an inspector of training schools. Ontario has made a forward step in having not only a Deputy Minister of Hospitals, an Inspector of Hospitals and an Inspector of Training Schools, but in having appointed also a full time medical Director of Hospitals. In no province, however, has any provincial officer or department the right to definitely direct hospital development to best serve the public needs. Before this can be accomplished the sharing of responsibility between the province and the municipalities will require more clarification, but the suggestion, if feasible, would prove a boon to many communities suffering from a sufficiency, and indeed a surplus, of general beds and a dearth of special accommodation.

G. HARVEY AGNEW

The Jubilee of the Discovery of the Tubercle Bacillus

It was on March 29, 1882, that Robert Koch reported to the Berlin Physiological Society his momentous discovery of the *B. tuberculosis*, now known as *Mycobacterium tuberculosis*. To demonstrate the organism Koch had to devise a new staining method, as the others known at the time were ineffective for the purpose. Subsequently Koch's bacillus was cultivated on coagulated beef serum.

It was originally intended that there should be a ceremony on a large scale on March 24th to which representatives of many nations would be invited. However, for sufficient reasons, the celebration in the proposed form has been postponed until next year, when the Congress of Microbiology will be meeting in Berlin.

It was finally decided, however, to commemorate the occasion in a smaller way by a function held in Berlin on March 5th, when speeches were delivered by the president of the German Ministry of Health, the president of the Robert Koch Institute and Professor Pfeiffer, of Breslau, the oldest of Koch's pupils. The jubilee of the discovery of the tubercle bacillus will also be honoured at the Eighteenth Annual Conference of the National Association for the Prevention of Tuberculosis, which will be held in London next July. Our own *Journal* is taking cognizance of the event by publishing a special article on Robert Koch, which can be found on page 475 of this issue.

A. G. N.

The Sixtieth Anniversary of the Foundation of L'Union Médicale du Canada

An event of more than ordinary importance—the sixtieth anniversary of the foundation of *L'Union Médicale du Canada*—was celebrated recently with appropriate ceremonies. Sixty years are a long time in the life of a man and they count for as much in the history of a medical journal. In 1872 our esteemed contemporary first saw the light of day, owing mainly to the efforts of Dr. J. P. Rottot, Dean, if we mistake not, of the Faculty of Medicine of Laval, Montreal, and for a time president of the College of Physicians and Surgeons of the Province of Quebec (1877 to 1880). His purpose was revealed in these striking words:—"Notre seul but: l'interêt du public et l'interêt de la science; notre unique motif: l'accomplissement d'un devoir." Naturally, under such auspices, and as one would expect, the new journal was a doughty champion for French ideals in connection with education and, particularly, in connection with medical education and was active, therefore, in moulding the Canada Medical Act, but, important as this may be regarded, something higher still was in the minds of the founder and his associates when they stated that the title of the new journal in itself indicated their objective— "the union of all the physicians of Canada *without distinction of origin.*" We believe some progress has been made towards the realization of this noble ambition. *L'Union Médicale* has always been active in promoting medical progress and reforms, in such matters, for example, as the education of midwives, vaccination against small-pox, the Municipal Board of Health, and the Medical Act, to mention only a few, and has been distinguished also for the notable quality, the reliability, and the scientific value of its contents.

The sixtieth anniversary of *L'Union Médicale* was celebrated in two ways—by the publication of a special issue in the month of February and by a dinner at the Cercle Universitaire on March the seventh.

The commemorative number of the journal is largely historical, as is proper. An informative article by the Editor-in-chief, Dr. Albert LeSage, gives an account of the foundation of the journal and of the many notable medical men of that fructifying period, the last quarter of the last century. Dr. E. P. Benoit has depicted the career of *L'Union Médicale* from 1872 to the present day; Dr. T. Pariseau tells of the development of French-Canadian university organization; Dr. Dubé writes on French-Canadian hospitals; and Dr. J. Gauvreau recounts the relationships that have existed between *L'Union Médicale* and the College of Physicians and Surgeons of the Province of Quebec. Besides these articles, which are of value for the proper understanding of medical currents and advances of this important period in the history of medicine in the Province of Quebec, there are a number of valuable scientific monographs. The whole number is excellently produced, is a mine of information, and a publication highly creditable to our French-Canadian confrères.

The dinner held on March seventh, to commemorate the anniversary, was a notable event. It was presided over by Dr. J. E. Dubé, President of the Board of Directors, who made an ideal chairman. After the toast to the King, the toast to the Canadian medical press was proposed and responded to by your editor and Dr. J. E. Desrochers. The editor of the *Canadian Medical Association Journal* made a plea for the closer collaboration of the two large medical journals of Canada, the *Canadian Medical Association Journal* and *L'Union Médicale du Canada*, pointing out the similarity of their aims, and expressing the hope that their common efforts might bring about a closer bond of union between the members of the medical profession of the two races—a thought in harmony with

their own aspirations as expressed by the title "L'Union Médicale." In this connection, too, it may be of interest to quote some of the views published recently by Professor Sergent, of Paris, who has made three visits to Canada and is well known here, views which have received the support of Deans Martin, Harwood, and Rousseau, and Professors Archibald, Dubé, LeSage and Masson. Professor Sergent thinks that there should be a closer intimacy between the two French-Canadian universities and McGill, which would take the form of an Anglo-French-Canadian Medical Society of the Province of Quebec, meeting alternately at Montreal and Quebec, and issuing a bulletin in which would appear articles written by members of the Society, associated members, and foreign contributors. This body would be a scientific organization centred around the universities of the province, and would help to maintain in Canada the traditions of both mother countries, France and England. The ideas animating Professor Sergent are admirable, but we may point out that we already have an Anglo-French-Canadian medical society in the Province of Quebec Medical Association which promises to do much in promoting friendly relationship between the medical men of the two races. The two existing journals can aid, by an interchange of *materiel* and a sympathetic consideration of our common problems, in bringing about this happy consummation, so much to be desired, and, we will add, so prophetically suggested in the title of our French-Canadian contemporary.

The *Canadian Medical Association Journal* desires to extend to *L'Union Médicale du Canada* its hearty congatulations and its best wishes for prosperity and for a speedy attainment of our common hopes and ideals.

A.G.N.

The Journal of Thoracic Surgery

The American Association for Thoracic Surgery was formed in 1917, mainly through the efforts of Dr. Willy Meyer, of New York. Far from being narrowly limited to one special field of surgery, the Association has, wisely, interested itself also in the fundamental problems of physiology, bacteriology, and pathology which arise in connection with the surgery of the chest, and it is noteworthy that its membership is drawn not only from the surgeons but also from the physicians, radiologists, and bronchoscopists. Until 1922 the Association was inarticulate, at least so far as the publication of a collected series of their papers was concerned, but after that date their material was published each year as a special supplement of the *Archives of Surgery*. However, the Association has finally outgrown this arrangement, and has decided to establish its own special journal, the first number of which is now before us.

The *Journal of Thoracic Surgery* has the distinction of being the only special journal of its kind in the English language. In fact there is only one other such journal in any language—*Archives Medico-Chirurgicales de l'Appareil Respiratoire,* the first volume of which appeared in 1926.

The Editor is Dr. Evarts A. Graham, of St. Louis, and the Associate Editor, Dr. Duff S. Allen, also of St. Louis. We note that Dr. E. W. Archibald, of Montreal, is on the Advisory Editorial Board. The new journal is to appear every two months and is published by the C. V. Mosby Company, of St. Louis. It presents an attractive appearance, and is well printed and well illustrated. Its scope may be gathered from the titles of the original communications, which are as follows:— "Post-operative atelectasis and collateral respirations," by C. M. Van Allen and T. S. Jung; "The mortality of operation for acute empyema," by George P. Muller; "The diagnosis and treatment of diaphragmatic hernia," by Stuart W. Harrington; "Hernia or eventration of the diaphragm," by Carl Eggers; "The importance of the respiratory movements in the formation and absorption of pleural fluids," by R. C. Brock and E. A. Blair; and "Important reflex relationships between the lungs and other viscera," by F. M. Pottenger. Besides these there are a number of abstracts of papers appearing in various other journals, English, French, German and Scandinavian, and a report of the Fourteenth Annual Meeting of the American Association for Thoracic Surgery. The articles are interesting and valuable, and the journal should serve a useful purpose in bringing together the work of the leading authorties on the thorax in a convenient and attractive form. We wish the new venture every success.

A.G.N.

Le Journal de l'Hôtel-Dieu de Montréal

The first number of a new journal is before us. It is to appear every two months, and, a mark of generosity and worthy purpose, will be distributed gratuitously among more than half of the French-speaking physicians of North America. In their preface the promoters, who modestly remain anonymous, set forth their intention to produce a journal that will be worthy of the noble and historic institution whose name it bears. The new journal will be general in character; it will deal with medicine, research, case histories, and medical history, and, from the list of contents provided in the first number, it is evident that it will be of interest and value. The first article is by Dr. Georges Baril, entitled "Laboratoire et Examen Clinique du Malade," the greater part of which was pub-

lished in our own *Journal* in April, 1931; the second is by Dr. J. Roméo Pépin on "Obésité et son Traitement"; another by Dr. J. Edmond Dubé, "Au fil de ma Clinique"; another by Dr. Oscar Mercier, "Le Catheterisme des Ureteres utilisé comme Agent Thérapeutique"; and, finally, one by Dr. Ernest Prud'homme entitled "La Gastrostomie Continente." There are also Short Notes on the Medical History of Canada, by Dr. Leo Pariseau, an illustrated account of the Hôtel-Dieu as seen from an aeroplane, and obituary notices of the late Drs. Albert Lassalle and Charles LaRocque, members of their staff.

The new journal presents a very pleasing appearance, and the eminence of the medical staff of the Hôtel-Dieu is such that one need not fear that the high standard set in the first number will be departed from. We wish the new journal every success and may be allowed to express the hope that it may aid in spreading far and wide the fair fame of the splendid institution that has struck its roots so deeply not only in the past history but also in the present day social and charitable activities of Montreal.

A. G. N.

Chiropractic and Nature Healing in British Columbia

Our readers will be interested in hearing about the investigation into the qualifications of chiropractors and nature healers that has recently been conducted in British Columbia. The Commissioner appointed, the Hon. Mr. Justice Murphy, appears to have had his hands tied so far as a complete study of the question was concerned, which is regrettable from the point of view of the medical profession. We are sorry that, owing to considerations of space, we are unable to print Judge Murphy's report, but are fortunate in being able to provide an analysis of it, written by Dr. A. P. Procter, the Registrar of the College of Physicians and Surgeons of British Columbia, which as he quotes largely from the Report, will give a sufficiently accurate account of what took place. The Report is now, we understand, before the Legislature, which has, of course, the final disposition of the matter. The chiropractors and nature healers are pressing vigorously for recognition and registration. Doctor Procter's able summary of the situation will be found elsewhere in this issue, under British Columbia news, and should be read by all.

A.G.N.

Special Articles

THE SURVEY OF NURSING EDUCATION IN CANADA*

BY GRANT FLEMING

Montreal

A Joint Study Committee of the Canadian Medical Association and the Canadian Nurses' Association was formed in 1927, and was composed of six members, three representatives from each profession. The Canadian Medical Association was represented by Dr. A. T. Bazin, of Montreal, Dr. Duncan Graham, of Toronto, and Dr. G. Stewart Cameron, of Peterborough, and the Canadian Nurses' Association by Miss Jean Gunn, Miss Kathleen Russell, and Miss Jean Browne, all of Toronto. The Committee agreed that "nothing short of a thorough investigation from coast to coast by a competent person experienced in the direction of such surveys, and belonging to neither of the professions directly interested, should be secured". Prof. George Weir, Head of the Department of Education, University of British Columbia, was selected to make the survey. The cost was borne in the proportion of 70 per cent by the Canadian Nurses' Association, and 30 per cent by the Canadian Medical Association.

Professor Weir states at the outset that "In a general way the major problems involved may be summarized as follows:—

(*a*) *Economic.*—Dealing with such matters as supply and demand; unemployment among nurses; fees and savings; distribution of nursing services; relative costs of staffing with only graduate nurses and of conducting a training school for student nurses, and many problems of similar import.

(*b*) *Educational.*—The type of young womanhood which should be encouraged to enter the nursing profession and the type of training she should receive; matters of preliminary education; admission requirements to training schools; examinations; varieties of training; methods of teaching; the minimum requirements in such matters as size of institution, equipment, teaching staff, clinical material, and other factors that should be considered in the constitution of the approved training school; methods of attaining more objective and reasonably uniform standards in such matters as curricula, involving also the controversial issues of theory and practice and the reliability of the ordinary examinations.

*Based on a Survey of Nursing Education in Canada, G. M. Weir, Professor of Education and Head of the Department of Education, University of British Columbia, Vancouver. 591 pages; Price, $2.00 postpaid. The University of Toronto Press, 1932.

(*c*) *Sociological.*—The community needs regarding nursing services are paramount here. Two main questions emerge: firstly, Are people of moderate incomes getting the kind of nursing services they need? and, secondly, Are such services available at a reasonable cost? Furthermore, the interests of the nurse, who obviously is entitled to a respectable livelihood in return for services rendered, must also be considered."

The second chapter is entitled, "Historical Sidelights and Evolutionary Tendencies". After pointing out that "As students of the history of education are aware, the healing professions have been intimately related to the fundamental institutions and movements—religious, military and chivalric—that have modified the course of mediæval and modern civilization", the Survey goes on to say that "Reasonable pay for an honest day's work is not only sound economy but sound ethics", and that ". . . many critics appear to believe that its membership (the nursing profession) should be obliged to subscribe to a sort of self-denying ordinance". In the opinion of the Survey, "Nursing is now passing through the . . stage. . . of the self-critical—in its professional evolution".

The seven cardinal objectives of education of The National Educational Association are given, in Chapter III., as (a) Health; (b) Control of the Fundamental Processes; (c) Worthy Home Membership; (d) Vocation; (e) Citizenship; (f) Worthy Use of Leisure; and (g) Ethical Character. "The training of student-nurses is a national service equally as much as is the training of student-teachers."

"A school without a teacher is obviously an anomaly in our provincial education systems." And yet, at the time when the fieldwork of the Survey was being conducted, there was not a full-time nursing instructor in the Maritime Provinces. What absurdities are perpetrated in the field of nursing education!"

The questionnaire and conference methods were used by the Survey to ascertain information concerning the different groups of nurses.

"Thus, 75 per cent of the private duty personnel had a lower academic standing than that represented by Junior Matriculation, which is ordinarily the equivalent of the minimum non-professional requirement for teaching in the elementary school." The private-duty nurse spends, on an average, 29.9 weeks on nursing duty out of the year, and reports the very high rate of 4.5 weeks off duty on account of illness. For this group, "The median annual income for Canada was $1,022. This amount includes the equivalent in money that would otherwise have been paid by the nurse for lodging, board and laundry if she were not on nursing duty".

". . . Sixty-five per cent of the institutional nurses had a lower academic standing than Junior Matriculation." They are on nursing duty for n aaverage of 46.3 weeks in a year, and their median annual gross income is $1,385. Of the Public Health Nurses, 65 per cent had a lower academic standing than Junior Matriculation. Their weeks on duty average 47.1, and their median annual income is $1,575.

The Survey records the opinion of the nurses on their training, whether too much or too little theory and practice; their liking for their work, etc.

Student nurses (1,368) answered a questionnaire. Of the group, 38.1 per cent are daughters of farmers A considerable percentage stated that they are too fatigued to follow their lectures. ". . . A number of leading doctors, who appeared before the Survey, characterized the present standards of physical examinations of student nurses as nothing short of 'criminal' ." The average student nurse spends 9 hours on nursing duty, 1½ hours at classes, and 1½ hours in study, which is a twelve-hour day. "No other profession would tolerate such working conditions."

"It is obvious that the problem of the selection of the nursing personnel is as important as that of the curriculum."

"Intelligence tests were given to representative groups of students registered in 109 hospital training schools in every province of Canada." Two thousand two hundred and eighty students were examined. "Intelligence tests are designed to measure 'ability to learn' rather than willingness to learn or capacity to be good." "The average I.Q. of the 2,280 student nurses is 98.3." "Two students (2) have I.Q.'s below 70 and hence come within the class of 'feeble-minded'." "Twenty-two (22) students have I.Q.'s of 70 to 75 and fall within the very dull or borderline group . . . One hundred and eighty-six (186)students with I.Q.'s from 80 to 85 are ordinarily classed as 'slow' . . . Two hundred and forty-eight (248) students have I.Q.'s from 85 to 90 and are also classed within the 'slow group'." "Several hundred student nurses grade 'bright' or 'very bright', and, on the basis of mentality, belong to the highest 20 per cent of the population." The Survey concludes that "Fully 40 per cent of the present student nurse personnel in Canada should not, owing to low grade intelligence, be permitted to practise on their own responsibility as private duty nurses."

The Survey proceeded to secure information from medical practitioners on nursing problems. The points covered were many. ". . . The weight of medical evidence is to the effect that the absolute amount of time devoted to theory should not be increased, while that devoted to practice should be relatively increased." Practically all agreed that the average nurse should be at least as intelligent as the average elementary school teacher. The doctors considered "lack of tact" as the most common defect, but regarded "carelessness in following orders" the most serious defect which they report as second in order of frequency.

Questionnaires were answered by 334 instructors of student nurses (physicians and

nurses). "The median rating of the instructors showed that student nurses have insufficient time for private reading and study." ". . . Students need fully 20 per cent more time for study." ". . . It can be truthfully stated that the books, magazines, journals and references found on the shelves of the average training-school library in Canada would compare very unfavourably, in a numerical sense, with the library of the average mediæval monastery before the introduction of printing!"

"If there is an educational institution in Canada that, above others, requires the services of the most skilled teachers available,—that institution is found among certain training-schools for nurses. It would indeed be difficult to find a so-called 'school' which is the scene of more pedagogic mistakes than are observable in a number of these comparatively youthful institutions. Immature and half-educated girls, admitted from the lower 50 per cent, both in intelligence and achievement, of their high school classes; 'lectured at' instead of being taught, and yet badly in need of teaching; too often given large doses of theory primarily adapted to the needs of medical students; too fatigued nearly half the time to remain alert in the 'lectures' and yet too timid to yield to the advances of Morpheus and the soporific effects of the environment; badly in need of refreshing sleep and yet, after a long period on night duty, often chased out of bed to attend a 'lecture'; with little time for real education, based on analysis, reflection and self-activity,—but the victims of hectic and concentrated 'cramming' spasms, during which lecture notes must be memorized to enable them to take another examination hurdle; required to use their hands and feet for ten or twelve hours a day, but profiting from too little opportunity to use their heads! . . . The student nurse should be no more expected to finance the hospital than the student teacher should be expected to finance the normal school."

The Survey finds that academic qualifications are a dead letter in some places. "In one of the Western training-schools visited by the Survey, the student personnel was selected as the result of an interview between a local clergyman and the applicants! The Survey was advised that 'educational qualifications' of the prospective nurses admitted to this school count for little so long as, in the judgment of this local divine, the applicants exhibit the 'true qualities of womanhood'!"

". . . Some of the conclusions that are based on the most valid evidence procurable.—

(*a*) The small training-school, with few exceptions, is comparatively inefficient.

(*b*) The small training-school has, in comparison with the larger schools, more consideration for the economic needs of the hospital than for the educational needs of its student nurses . .

(*c*) Student nurses with little or more intelligence or education than some charwomen are admitted to a number of the small training-schools, which therefore are a detriment to the adoption of adequate nursing standards in the provinces concerned. On the other hand, some student nurses in the small schools rank high both in intelligence and education."

The chapter on Nursing Registries makes the following interesting statement:—"The up-to-date and efficient registry should, in the judgment of the Survey, register practical women and other types of practical attendants."

Methods of Teaching and Learning are dealt with, and the lack of trained teachers is stressed. "If teachers do not need training in educational psychology and the principles of method, then the huge annual expenditures on normal schools, faculties of education, and teacher training colleges in Canada are a gross swindle and a sad reflection on the intelligence of Canadians. . . Teachers must be trained as are the members of any other profession—and trained for greater purposes than merely 'to impart instruction'."

Following a discussion of examination methods, which lays bare the unreliability of the marking of the essay-types of examination, the Survey concludes that "the R.N. examinations should, in the judgment of the Survey, be reformed rather than abolished".

The Curriculum naturally receives considerable attention. There is a lack of good text-books. Reference is made to the preparation of a series of suitable text-books, in French, by a Montreal group. A curriculum is outlined and discussed.

"Many cases regarding the 'unsettling, nerve-wrecking, morale-destroying' effects on the nurse of long periods of unemployment—during which she remains in a condition of feverish tension or anxiety, wondering whether she will be called out on another case before all her money is spent—were reported to the Survey."

Having dealt with present conditions, the Survey goes on to consider administrative problems and cost of training, from which it proceeds to The State and Public Health, leading to a discussion of "It cannot be denied that the problem of state medicine, in some form, must eventually be faced . . ." The Survey supports what it calls "the school of moderate thought", which among other things, holds that "Adequate socialization of nursing services would reduce—by a process of distribution—the cost to the individual without diminishing the quality of the service".

"If we assume—and the assumption does not appear unwarrantable—that the average intelligence of the 2,280 student nurses discussed . . . "is at least equivalent to the average intelligence of the citizens of Canada, the conclusion appears inescapable that approximately 50 per cent of the latter need some guidance and possibly even compulsory direction, paternal or otherwise, in the matter of providing against the high and constantly mounting costs of illness. This is not the statement of any new conclusion based on scientific fact—although the facts are scarcely

subject to dispute—but of a well-known principle already accepted in the sphere of public education. If compulsory attendance at school is justifiable for the protection of the state against the evils of ignorance and illiteracy, the seedbed of anarchy and communism, is not some form of compulsory health insurance also justifiable for the protection of the community as well as the individual against the improvidence of that rather large section of the population that lacks sufficient foresight or moral stamina or earning capacity or social opportunity to protect itself and its dependents against the possible inroads of disease?"

The final chapter on Control and Supervision "is primarily concerned with the economic and social aspects of the nursing problem as viewed from the angle of the needs of the community and those of the nursing profession". "Economic obstacles that separate the patient from the nurse should be removed . . . Socialization of nursing services, with adequate distribution of the financial burden through a form of state health insurance, is, in the judgment of the Survey, an important factor in any successful attack on Canada's major health problem." ". . . There would not be a surplus of graduate nurses to-day if the economic gap between the latter and the patient of average means were effectively bridged." Several possible schemes for the socialization of nursing are presented. The system recommended by the Survey provides for a Federal Council of Nursing with Provincial Councils. Supervision of nurses would be provided. The nurses would be on the continuous-employment, regular-salary, basis.

Growing out of these findings, the following recommendations are made by the Survey:—

1. A comprehensive and thoroughly organized system of supervision and control of the nursing personnel and services in Canada should be established. Such a system should have both a general, or federal, council, exercising advisory, educational and directive functions, as well as provincial councils.

2. It would be in the economic as well as the health interests of the Canadian people if the number of public health nurses were at least doubled within the next five years.

3. Nursing should be regarded as a profession, however immature, in the attainment of professional standards, rather than as a potential member for a trades union.

4. Registration of all nurses or others who care for the sick for hire should be made compulsory.

5. More emphasis in the training of all nurses, but especially of public health nurses, should be laid on Mental Hygiene and Sociology.

6. In order to be approved, training-schools for nurses should be attached to hospitals having at least seventy-five beds and a daily average of fifty patients, as well as having adequate clinical teaching facilities and equipment. There should be at least one qualified full-time instructor.

7. A full-time instructor should be available for each approved school. An immediate increase in the number of qualified full-time instructors is imperative.

8. The minimum academic requirement for admission should be Junior Matriculation. The establishment of a matriculation for nurses is recommended. More rigid educational and intelligence standards should be immediately applied.

9. Eight-hour duty should be introduced.

10. The approved training-school should be considered primarily as an educational institution rather than as an economic asset to the hospital.

11. Student nurses should be taught not less theory, but theory that is more adapted to their needs.

12. More ample provision for hourly or part-time nursing, among people of average means as well as for the poorer sections of the community, should be made.

13. The state should pay the net cost of educating student nurses.

14. The socialization of nursing services should be adopted.

15. A Dominion Registered Nurses' Examination (D.R.N.), under the control of the Federal Nursing Council, should be established.

The book is well printed, but the lack of an index is to be regretted. A summary, by the author, of his findings and recommendations would be helpful to a full reading of the report and for those with limited interests.

The reviewer feels that this brief summary is far from being an adequate statement of what is covered by the Survey. Anyone interested in the subject is urged to read the full report, which is most comprehensive and informative, and for which the highest praise is due to Professor Weir and the Joint Study Committee.

CAPITALS AND ITALICS.—Medical writers who recognize the desirability of following the modern practice adopted by technical journals of good standing, and who wish to give the least trouble to editors and printers, should read an article on the use and abuse of capital letters and italics which appeared in the *Indian Medical Gazette* for August, 1931. The broad principles laid down therein are not difficult to follow or to remember. To put the matter very shortly, we advise authors when in doubt to avoid beginning words with capitals. Italics should, in general, be reserved for titles of books and periodicals, for side-headings to paragraphs, for words and phrases in foreign languages which have not yet become anglicized, and for the proper names of micro-organisms, as *B. coli communis*. Italics for emphasis should be used very sparingly indeed; more often than not they defeat the author's purpose.—*Brit. M. J.*, 1932, **1**: 128.

Men and Books

THE ROBERT KOCH ANNIVERSARY—THE MAN AND HIS WORK

BY D. A. STEWART, M.D., F.R.C.P. (C.), LL.D.

Ninette, Man.

Great man as we know he was, it would seem that Robert Koch has not yet quite reached his full stature in the grand assembly of the immortals. The twenty-two years since he died have been too full of the sound and fury of war and the bickerings and back-bitings of peace to give quietness for thought about such things. The very greatness of his discovery of the bacillus of tuberculosis may have overshadowed his other triumphs and given the impression of a man of one great achievement, when he was in reality a man of many very great achievements. It is true, also, that the first fiasco and tragedy of tuberculin, while it did not crush him as a lesser man would have been crushed, did give wrong and unjust impressions of the man which persisted even when tuberculin had come to be something considerable in treatment, a very great thing in diagnosis, and epoch-making as an illuminating phenomenon. And there is no doubt that his prestige suffered for a time from his change of view about bovine tuberculosis, and the firmness—called by his opponents obstinate dogmatism—with which he maintained its comparative harmlessness to human beings. In these things there may have been mistakes, for to err is human. But it is not his littlenesses, if he had any, but his greatnesses that are immortal, and if this fiftieth anniversary of his most outstanding discovery is made a time for a new appraisal, it should give to Koch a very high pedestal even among the great of all ages.

When Robert Koch died in 1910 Paul Ehrlich said that our entire knowledge of infectious diseases rested on foundations he had laid, and that he had given us the two new sciences of experimental immunology and experimental therapy. Every physician and every surgeon almost every day use the discoveries of Koch. Every bacteriological laboratory bases its methods on his and uses adaptations of his apparatus. And outside of laboratory walls, when any community fights the evil pestilences of cholera, of tuberculosis, typhoid or diphtheria, or supplies to its people pure food and water, it applies principles this great originator demonstrated. Much both of modern bacteriology and modern epidemiology is founded on the discoveries of Robert Koch.

Several generations of Kochs had lived about Klausthal in Hanover, usually in some government employment, before Robert was born there on December eleventh, 1843. His father was a man of force and intelligence who carried the title of Bergrath or expert mining engineer; and not the least important part of Robert's education was in accompanying his father on some of the travels and investigations the work of a mining engineer demanded. The formal discipline and educational pabulum of the local gymnasium seems to have been poor enough, but this boy was fortunately a "self-starter." Besides the journeys, and likely because of them, his boyhood was spent busily in many pursuits of his own; in making collections of minerals, plants, and small animals, and in discursive reading in geology, botany and zoology, pursuits and interests he retained throughout life. His manhood's work was just a later development of his boyhood's play. Happy the boy, and the man, who never knows just where play stops and work begins. The boy who teaches himself may lack much, but at least he escapes the distastes and disgusts and "fed-up-ness-es" that dog the path of much adult-directed education. Hill-sides are wonderful class rooms, and the free out-door life of young Robert built up a rugged physique and unusual powers of endurance that made the constant work of a very full life possible. This embryo scientist was just about to be shaped into a merchant when some windfall of property came to the family and a university education became possible. The choice then was medicine, with the idea of his becoming a ship's surgeon.

Among the professors at the University of Göttingen when nineteen year-old Robert Koch entered it in 1862, were Woehler, the discoverer of synthetic urea, William Krause, the pathologist, and George Meissmer, physiologist. But the deep, strong, character-moulding, life-shaping influence and inspiration for Koch was that of Jacob Henle and his theory of contagion which had been published first in 1840.

At the age of twenty-two Koch won a prize for an essay on the structure of the uterine nerves, and was made assistant in the museum of pathology. He was set to work on the secretion of succinic acid in animals fed on fat only. With commendable enthusiasm he tried half a pound of butter a day himself, but after five days of nausea was content to confine his enquiries to the lower animals. It was on this bit of work that he presented his Latin thesis on graduating with distinction in 1866. After three or four years, divided among a house physicianship in the General Hospital at Hamburg, work in a hospital for the insane, and two country practices, he enlisted as surgeon in the Franco-Prussian war and when in 1872 this service came to an end, secured the position of district physician

* Read before the Winnipeg Medical Society, March 17, 1932.

in the small remote Polish-frontier town of Wollstein.

In this obscure practice, Robert Koch grew up into the fine company of country physicians such as Jenner and Beaumont and Mackenzie, who turned their very handicaps into advantages and climbed to greatness upon them. Without equipment, and alone, he entered upon research work that made bacteriology a science and his name immortal. Across the corner of his small office he hung a black curtain. Outside this curtain the district physician dealt faithfully and thoughtfully with the itches and ringworms, the aches and whooping coughs, the teethings and infections of country practice. Behind the curtain every spare moment was spent in trying to find answers to the innumerable questions his own very ordinary practice raised in his mind. There is no practice so small or so ordinary that it cannot furnish many questions to be answered, and some means of answering them. At first, it is said, Koch was too poor to buy a microscope, but his wife economized in her household expenditures and bought one for him. May I quote here from Dr. W. W. Ford, who, a year after the death of Koch wrote of him for the Bulletin of Johns Hopkins Hospital?—

> "Here in Wollstein Koch remained for years busily engaged in the general country practice of medicine. He was forced to take long rides over rough country roads by day and by night and minister to the needs of people in the humblest circumstances. He was out of touch with university affairs which he loved. He was outside the circle of intellectual activity, the stimulus to great endeavour; and yet, from the time of Koch's arrival in Wollstein, we know that he occupied himself unceasingly in attempts to solve the most important questions in medicine of his day and generation. We know that he fitted up for himself a laboratory, setting aside a portion of his consulting room for this purpose. We know that immediately after his arrival there he purchased a new microscope and a microtome and that in his improvised laboratory he installed a piece of apparatus the use of which he had learned in the Physiology Institute at Göttingen, an incubator or thermostat which could be kept at the body temperature. We know that Koch devoted all his spare time to the study of a disease of animals widely spread in the district where he lived,—anthrax or splenic fever—and that he carried out all sorts of experiments in his study of this disease.
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> "We do not know why Koch did not lapse into the respectable mediocrity which his position in life and his professional opportunities made for him the line of least resistance. Something of his youth, when his chief pleasure was the amateur collection and dissection of plants and animals, something of the influence with which he was surrounded in the year at Göttingen, possibly the inspiration of his teacher and master Henle. Something it was which kept Robert Koch from degenerating. Something kept his fingers busy with slides and cover slips, and his eyes glued to the microscope in all the spare hours he could snatch from the exacting duties of a country practice."

After four years of work in Wollstein, word came to Cohn, the Professor of Botany at Breslau, the nearest University town, that a young, unknown, country doctor of thirty-three was prepared to demonstrate the life history of anthrax. When the generous Cohn had seen what Koch had to show he is said to have rushed back to his own laboratory, summoned his staff, and hurried them all over to see the wonders that had come out of the wilderness. He is quoted by Dr. Welsh, who was his student at the time, as saying: "It leaves nothing to be proved. He shows us things from which a new epoch of biology will be dated. It is the greatest discovery ever made with bacteria, and I believe this is not the last time this young Robert Koch will surprise and shame us by the brilliancy of his investigations." Once more the stripling with his sling and his smooth stones out of the brook had slain a great Goliath of Gath. The paper that followed is a classic. In the fifty-six years since it was written not one of Koch's observations, it is said, has been disproved.

Koch was now well enough known to have a better job as municipal physician in the University town of Breslau, but soon gave it up to return to the coveted and fully-used leisure of the country practice at Wollstein, which received him back with open arms. A year later, in 1877, he published a paper on "Bacteriological Technique," which it is not too much to say laid the foundations in that science, and the following year one on "The Etiology of the Traumatic Infectious Diseases," which described six kinds of causal organisms. In this paper he amplified and justified the antiseptic principles of Lister. At Lister's request the paper was translated into English, and published in 1880 by the New Sydenham Society.

It was not until 1880, when he was thirty-seven, that, through the influence of Cohnheim, Koch was appointed to a vacancy in the Imperial Health Department at Berlin, with Loeffler and Gaffky as assistants. Here a paper appeared, probably still growing out of the studies at Wollstein, on "The obtaining of pure culture organisms by spreading liquid gelatin with meat infusion on glass plates." Pasteur is said to have impulsively rushed up to greet the younger man, saying—"This is a great advance." About this time also the plan was devised of sterilizing by dry steam.

If Koch had made his country practice, with its many disadvantages, a preparation for research and discovery to be pursued with better advantages elsewhere, it would have been a fine thing. But what he did was much greater. In mere odds and ends of interrupted time, right among the occupations and perplexities of country practice, he made his world-startling discoveries, and made them alone. When the black curtain had been finally taken down, and he left homely Wollstein for far Berlin he had already brought to the birth out of the womb of Time the science of bacteriology, full-armed at birth, that was to occupy his ample and beneficent life. He had now reached the end of what has been called the constructive period of his career; he had fabricated his tools. The rest of his life was to be spent in using them. As he himself said, "When once the right method had

been found, the solutions of problems came to our hands like ripe apples falling from the tree." He was never satisfied with a theory or a mere unfruitful fact, but was always keen to apply his theories and facts for the betterment of public health. The second half of his life was spent in battering down the strongholds of disease after disease by the methods of bacteriology he had discovered in the first half.

Robert Koch, not yet forty, had made three great discoveries, each opening up a new field, the life history of anthrax, the general technique of bacteriology, and the causes of traumatic diseases. The second period of his life work, the period of applying bacteriological technique to disease control, opened with the best known of all his discoveries, the one that inspires our gathering this evening. On March 24th, 1882, he proved to the members of the Physiological Society of Berlin that he had found the long-sought direct cause of tuberculosis, and on the 10th of April following published this discovery, with the famous postulates. No proof was ever more complete. He demonstrated the organism in the lesions of men and animals; he grew it in pure culture; he produced characteristic lesions in animals by inoculation from pure culture, and he recovered the organisms again from lesions in the animals so inoculated.

This settled once for all the question of centuries, and the hot dispute of the past century. Phthisis was infectious. It demonstrated once for all the unity of tuberculosis; that consumption in the chest and white swelling of the knee, Pott's disease and scrofula, Addison's disease and tabes mesenterica, lupus, hip-joint disease, some kinds of meningitis and some pleurisies, all had a common cause, the bacillus of tuberculosis. It showed that phenomena which for centuries had been explained by consanguinity were really explainable by contact. Thus the Arch-Destroyer of the lives of mankind was brought out into the open. Here began a campaign against the Captain of the Men of Death in which people and governments joined with medical science and medical art. Koch led the way, not in bacteriology alone but, characteristically, in measures of administration also. He devised strategy, improvement in living conditions, compulsory notification of disease, hospital accommodation for the far-advanced spreaders, sanatorium care for early disease, and the enlightenment and education of the whole public. For nearly thirty years Koch dominated the whole campaign against tuberculosis.

Other triumphs came thick and fast. In 1883 Koch went as head of a German commission to study cholera—which then threatened Europe,—in Egypt and India. From this adventure he returned with three scalps at his belt, the vibrio of cholera, the Koch-Weeks bacillus of Egyptian ophthalmia, and amœbæ as causes of dysentery. In 1885, a Professorship of Hygiene and Bacteriology was created for him in the University of Berlin. Among his assistants and pupils were such men as Gaffky, Loeffler, Pfeiffer, Welch and Kitasato.

The whole world of science, and the whole world of men and women gave thanks when in 1890 it was announced that the worker of wonders, Koch, had found a specific and effectual cure for the age-old white plague of mankind. The sick were hurried across continents and over seas to get this elixir of life just a little sooner, got it, and in many cases became worse or died from the huge over-doses. We can see easily what the ravages of this two-edged sword might be when used with much faith and no knowledge.

Koch had learned the extreme danger of being at once a scientist and the most talked of man in the world. There is no doubt whatever that the announcement of tuberculin was forced from him against his better judgment, and indeed in self-defence. No scientist could be more conscientious; none less flamboyant or more matter-of-fact. Nothing was ready for publication until it had been verified again and again. A favorite phrase was, "I leave no loop-hole." But the public was simply mad for the sure cure they thought Koch had, and pried out of his hands prematurely the likely-to-be-useful, but untried, laboratory product he was working on. What he said truthfully about its unreadiness and his moderate claims for it was shouted down by the people who were sure it would give them life. "It was really my intention," he says, "to bring my investigations to a complete issue, and especially also to get a thorough experience in the application of the remedy in practice and to provide for its production on a larger scale before making anything public about it. But, in spite of every precaution, too much about it, and really in a distorted and exaggerated manner, has leaked out. So that it seems to be obligatory upon me, in order to prevent the formulation of false ideas, to give even now an orientating survey of how the matter stands. It goes without saying that under existing conditions it must fall short and many weighty questions must remain open." The fiasco was temporary only, and was not the fault of Koch. Koch believed in tuberculin, kept working at it and with it, and with all its obscurities it has been and is one of the very greatest teachers about tuberculosis.

Still achievement succeeded achievement. An Institute of Infectious Diseases was founded in Berlin in 1891 for Koch, occupied by him for three years, then by one of his pupils, leaving him more free for work throughout the world. Cholera in Hamburg was fought in 1892, and a paper published next year on water-borne epidemics, embodying what had been learned. In 1896 he was investigating rinderpest in South Africa for the British Government, the next year, plague in India, and the next, again, malaria in Italy.

In 1882 Koch had been quite sure that tuberculosis in human beings and Perlsucht in cattle were one and the same disease, but by 1901 he

had come to consider them distinct and bovine tuberculosis either no danger, or only a slight danger, to human beings. At a time when large sacrifices were being urged to clear up bovine disease, Koch's new view spread consternation at the London Conference among progressives, and gave much comfort to obstructionists. It seemed to set back the clock twenty years. Lord Lister, who presided, mildly pleaded with his confrère to work it over again. The reply to Koch was a Royal Commission in Britain and the counter reply a Royal Commission in Germany. The fat was in the fire.

In 1902, the indefatigable Koch was studying Rhodesian red-water fever, horse sickness, trypanosomiasis, and methods of controlling typhoid. In 1905 the great honour of the Nobel prize came to him. In 1906 he headed a sleeping sickness commission in Africa.

In 1908, at the Congress on Tuberculosis at Washington Koch was very definitely the central figure, even in the presence of Trudeau, Welch, Theobald Smith, Osler, and a flash of President Roosevelt himself. He still defended his old thesis of the comparative harmlessness of bovine tuberculosis to human beings, but with much less than his old dogmatism, and more leniency toward the British view, and promised to devote the remainder of his life to the settling of the question. Unfortunately, the remainder of his life was all too short. His one-time rugged health had been impaired by unremitting work and life in tropical climates, and less than two years later, on May 27th, 1910, he died of arteriosclerosis and myocarditis at the early age of sixty-seven.

It has been said that the Science of Medicine has years or centuries of ebb, then periods of flow with many tidal waves. In the full flow of the second half of the nineteenth century three tremendous wave crests were the divine imagination of Pasteur, the sound practical wisdom of Lister, and the methodical, but illuminated, intellect of Koch. Koch was the ideal scientific worker, with courage, acuteness, insight, industry and perseverance, with zeal, enthusiasm and a practical aim, close and untiring work the very breath of his nostrils. "*Nunquam otiosus*," "Never idle," was his motto. He earned one great reputation in tropical diseases, another in anthrax, another in tuberculosis, another in bacteriology, and still another in epidemiology. He demonstrated the causes of tuberculosis, cholera, anthrax and ophthalmia, was co-discoverer with Eberth of the typhoid bacillus, made the right guess about malaria, though Ronald Ross proved his guess first, laid foundations in bacteriology and epidemiology, and added usefully to our knowledge of rinderpest, sleeping sickness, surra, blackwater fever, plague, malaria, leprosy, Texas fever, and perhaps half a dozen or half a hundred other ills of men and animals. In a little more than a decade the causes of eleven of the greatest killers of men, tuberculosis, cholera, typhoid, diphtheria, erysipelas, tetanus, glanders, pneumonia, epidemic meningitis, influenza and plague, as well as of many animal diseases, were discovered by Koch and his pupils.

Osler, with his rare gift for happy phrases that drop like new-minted gold into eager circulation, spoke of Robert Koch as the Galileo of Medicine, peering through glasses for almost the first time at the universe of the infinitely small. It may be safely predicted that his name and stature will grow with time. The full significance of his work is even now not half unfolded.

FLORENCE NIGHTINGALE, 1820-1856*

By MAUDE E. ABBOTT

Montreal

This volume is a valuable contribution to our knowledge of the life of Florence Nightingale and of the forces at work in her great career, and throws additional light also upon the difficulties she had to overcome in the herculean struggle for Army medical and nursing reform which she waged in the middle nineteenth century, and from which she emerged victorious, to the lasting benefit of the succeeding generations.

Like the great biography published by Sir Edward Cook in 1913, and the recent revision of this work by Mrs. Vaughan Nash in 1925, Mrs. O'Malley's book is based upon a close study of Miss Nightingale's private diaries and correspondence and upon official records from the War Office and elsewhere, placed at her disposal by the heroine's family and other authorities. It does not, however, compete with, or attempt to replace, the above publications, which the author in her preface urges must be read and should be possessed by every one interested in this great subject. The method of approach is, however, here an entirely different one, for the effort has been made to compile from private diaries and correspondence what is virtually an autobiography, written as far as possible from Miss Nightingale's own point of view, and making use of her own words to tell the story wherever this can be done. Considerable additional material has evidently been made available, and the author has used this with discrimination and insight. So that it is fair to say that we get here a more intimate and living picture than has yet been presented and one which approaches very closely to a real autobiography, especially in her earlier years, revealing, to a greater extent than has hitherto been done, Florence Nightingale's motives and doubts, aspirations and affections, as well as that intense spiritual sense of a definite vocation to God for the service of others which dominated her consciousness from the first dawn of adolescence, and was in her life as the lode-star of a great destiny.

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*Florence Nightingale, 1820-1856. A Study of her Life down to the End of the Crimean War, by I. B. O'Malley, 416 pages, 24 illustrations. Price, 21/. Thornton, Butterworth, 15 Bedford Street, London, W.C. 2; Thos. Nelson & Son, Toronto, 1931.

As its title conveys, the book only carries us to that period in her life ending with the Crimean War, at which time Florence Nightingale was thirty-six, but it ends on a note prophetic of the far-reaching reforms that were the product of her years of activity following upon that tremendous episode. It reads: "So Florence Nightingale had come home, but not to rest, for God did mean her to go on living, and she was right in thinking she was only at the beginning of her work." The material is divided into two parts, of which the first deals with her earlier life and the second with the period of the Crimean War. Part I. is, we think, the most revealing and valuable part of the book. At first sight it may appear too drawn out, but its freshness of style and accuracy of detail make it of enthralling interest and at the same time a convincing prelude of essential importance in the train of the great events that followed.

Part I. (1820-1854). Of quite delightful naïveté is the opening Chapter I. (1820-30), entitled, "*La Vie de Florence Rossignol*", which is compiled from a real autobiography written in French as a school-exercise in her ninth and tenth years by Florence herself, consistently carried out by her with much conscientiousness, and transcribed here almost verbatim. No more charming picture could be obtained of the wholesome and happy life in the twenties of the last century of an intelligent English child placed by fortune in the midst of a large and affectionate family circle in good material circumstances. Mr. Nightingale was a wealthy man, of rather advanced views, a member in his earlier years of that interesting group of thinkers among whom the Martineaus were so prominent, and his two daughters grew up in contact with the dawning liberalism of the age and with all the rich social and educational advantages that money and position could bring them. In 1837, too, when Florence was seventeen, they were taken by their parents to the continent and spent two wonderful years in centres where their father's connections gave them the entrée to a distinguished society where the burning political issues of the time were freely discussed. In Italy, especially, where they made the longest stay, they had felt the thrill of the United Italy movement and their young hearts beat high in sympathy with the hopes and sufferings of the devoted patriots and exiles of that heroic cause. These colourful experiences, reacting at an impressionable age upon a keen imagination and a highly sensitive nature, and interwoven with all the revelations that art and music and life itself in a foreign capital had to bring, are truthfully and engagingly portrayed in Florence's own girlish phraseology, both in the copious diaries which she kept faithfully during this entire period and in her letters to her friend and cousin Hilary Bonham Carter, and are here quoted in the first person at length and with delightful freshness.

Not less revealing is the glimpse which we get only a year or two later after their return home (Chapter II., 1839-1842), of the lack of live interests and the serious limitations which hampered the lot of young Englishwomen of the so-called leisure or cultured class in the mid-Victorian age, and which, in the case of one endowed as was Florence Nightingale with immense administrative and intellectual powers, proved peculiarly galling in spite of her deeply affectionate home-nature which strove hard for adjustment and for submission to the domestic conventions which enclosed her as by a cage. Moreover, the unfortunate "condition of the people" in this period of her growing womanhood could not but stir powerful impulses of pity and sympathy in a heart attuned by nature to the woes of others and aroused within her a conflict that was almost unbearable in the midst of the round of gaieties and trivial duties, from which escape was both impossible and at that time undesirable. "The only way to make life real" she writes repeatedly, "is to relieve human misery". So intense was her consciousness of the unhappiness existing without the gates of her beautiful home that we find her breaking out, in the midst of a reverie on the rural charms of her beloved Embley, "and all the time behind the cedars goes up the cry of a world in pain". It was indeed a time of fermenting activity when great forces were at work for the relief of the labouring classes of England, crushed as these were between the artificially high price of food on the one hand and starvation wages on the other. In this same chapter Mrs. O'Malley has some illuminating footnotes citing the efforts that were being directed against the political and social oppressions of the time. Thus Lord Ashley (later Lord Shaftesbury) began his struggle for Factory Reform in 1833 and was still continuing it in these years, 1839 to 1842; the struggle for public health had begun through the "Reports on the Poor Law Commissioners of East London" of Arnott and others; Charles Dickens, in protest of other evils, published his *Oliver Twist* in 1838 and *Nicholas Nickleby* in 1839; Cobden too was planning his agitation for the repeal of the Corn laws, and in that same summer of 1839 the great "People's Charter", bearing a million and a half of signatures, went up to Westminster on a triumphal car; while Thomas Carlyle "drew all these facts into the furnace of his mind, whence they presently passed forth in a molten stream and burned themselves into the consciousness of the best men and women of the time"; and Charles Kingsley, only a year older than Florence Nightingale, was preparing to enter the lists on behalf of his fellow man, and published his exposure of conditions among the sweated tailors in *Alton Locke* in 1850. Small wonder was it, then, that the ever present Call sounded louder and more insistently yet in the heart of her whose pent up powers were straining at the leash with an ever-increasing yearning to be spent, wholly and unreservedly, in the relief of suffering humanity and the alleviation of "the misery of the world". At last, at thirty-one,

she went, with her parents' rather unwilling permission, for three months' training to the Deaconesses Institute of Pastor Fliedner at Kaiserwerth on the Rhine, and then in August, 1853, accepted, at last with their full approval, her first responsible post in charge of the Home for Sick Governesses in Harley Street.

Part II. (1854-56). And so it was that, when the Crimean opportunity came, as it did in October, 1854, it found her ready, with all the crowding domestic obstacles of her youth removed, prepared in all the spiritual depths of her being, for the Great Adventure of her time. The dreadful state of the Crimean hospitals, with the tragic fate of the wounded and dying soldiery, and the terrible mass of suffering that was soothed and mitigated there through the unbounded tenderness of her woman's heart; the extraordinary difficulties of all sorts that impeded the execution of her stupendous task of reform; the indomitable will with which she swept aside or rose above all such obstructions; the strategic genius of her, the greatest sanitarian of that age, whereby the appalling death-rate of 42.7 per cent in the great Barracks Hospital at Scutari was reduced within six months to 22 per thousand; and the magnitude of her final immense achievement; all this forms an integral part of Sir Edward Cook's great biography, and has passed thence into acknowledged history. But in Mrs. O'Malley's pages we find the charm of many a pathetic incident or tender or witty passage unquoted elsewhere, while from their vivid detail we get a clearer insight into the causes of those petty obstructions and false positions that hampered and embarrassed the Crimean nursing situation, and that cast at times a wholly undeserved shadow across the sunlight of a great endeavour, and one of the most heroic episodes of all history.

The book is completed by genealogical tables of both sides of Miss Nightingale's family and by a good index. It contains further a number of fine photogravure portraits, hitherto unpublished, of Miss Nightingale and her parents and of certain friends whose lives were closely interwoven with her own: Hilary Bonham Carter, "Aunt Mai" (Mrs. Sam Smith), Mary Clarke, Sydney Herbert and his wife, Dr. Sutherland and others, as well as a coloured frontispiece of her sister and herself. From this point of view, also, it is a very precious addition to the literature on Florence Nightingale which should be in the possession of all who revere her memory and of everyone interested in the great field of national biography.

I am a part of all that I have met;
Yet all experience is an arch wherethro'
Gleams that untravell'd world, whose margin fades
For ever and forever when I move.—Tennyson, *Ulysses.*

Association Notes

Preliminary Program for the Sixty-Third Annual Meeting, Canadian Medical Association; and the Fifty-Second Annual Meeting of the Ontario Medical Association.

TO BE HELD IN TORONTO ON JUNE 20th, 21st, 22nd, 23rd and 24th, 1932.

Headquarters—The Royal York Hotel

Registration will commence at 8.30 o'clock on the morning of Monday, June 20th, in the Royal York Hotel, and will continue throughout the week.

The first two days—Monday and Tuesday, June 20th and 21st, will be devoted to the business sessions of the two Associations, while Wednesday, Thursday and Friday will be scientific days.

SKELETON PROGRAM

Monday, June 20th

8.30 a.m.—Meeting of the Executive Committee, Canadian Medical Association, in the Club Room.

10.00 a.m.—Meeting of Council, Canadian Medical Association—Roof Garden.

1.00 p.m.—Luncheon to Council, as guests of the President-Elect, Dr. A. Primrose
Valedictory Address—The President of the Canadian Medical Association, Dr. A. S. Monro, Vancouver.
Installation of the President.

2.15 p.m.—Meeting of Council—Roof Garden.

5.00 p.m.—Annual Meeting Canadian Medical Protective Association—Roof Garden.

7.00 p.m.—Dinner to Council in the Ball Room—Guests of the Academy of Medicine, Toronto.

Tuesday, June 21st

9.00 a.m.—Meeting of Council, Canadian Medical Association,—Roof Garden.

1.00 p.m.—Luncheon.

2.15 p.m.—Official opening of the commercial exhibits.

2.30 p.m.—Meeting of the Committee on General Purposes of the Ontario Medical Association—Roof Garden.
Golf for those who are free.

6.00 p.m.—Meeting of the Nominating Committee of the Ontario Medical Association.

Tuesday, June 21st—*Continued*

7.00 p.m.—Dinner to Council in the Ball Room —Guests of the Ontario Medical Association.

(The program will be in charge of the Committee on Inter-Relations of the Ontario Medical Association.)

Wednesday, June 22nd

8.30 a.m.—Registration in Banquet Hall, Royal York Hotel.

9.15 a.m.—Sectional Meetings, Royal York Hotel.

1.00 p.m.—Luncheon, Royal York Hotel Roof Garden; Guest Speaker, Sir Arthur Currie. Short Business Session.

2.15 p.m.—General Session, Concert Hall, Royal York Hotel.

4.30 p.m.—Garden Party, University Quadrangle, Dr. and Mrs. Primrose.

7.00 p.m.—Annual banquet of the Canadian Medical Women's Association, at the Granite Club.

9.00 p.m.—Osler Oration, delivered by Dr. Francis Packard, Philadelphia, followed by a musicale and reception by Dr. and Mrs. Primrose.

Thursday, June 23rd

8.30 a.m.—Clinics at the Hospitals.

10.30 a.m.—Sectional Meetings, Royal York Hotel.

1.00 p.m.—Luncheon, Roof Garden, Royal York Hotel; Guest Speaker, Sir Robert Falconer, Toronto.

2.15 p.m.—General Session, Concert Hall, Royal York Hotel.

4.30 p.m.—Garden Party at Ardwold, guests of Lady Eaton.

7.45 p.m.—Association dinner-dance, Concert Hall and Ball Room, Royal York Hotel.

Friday, June 24th

8.30 a.m.—Clinics at the Hospitals.

10.30 a.m.—Sectional Meetings, Royal York Hotel.

1.00 p.m.—Luncheon, Roof Garden, Royal York Hotel; Guest Speaker, Canon H. J. Cody, Toronto.

2.30 p.m.—General Session.

8.00 p.m.—Public Meeting, Concert Hall, Royal York Hotel; Speakers, The Right Honourable R. B. Bennett, Prime Minister of Canada;

Dr. Geo. Kosmak, New York, on "Maternal Welfare."

Dr. J. H. Mason Knox, Baltimore, on "Infant Welfare."

GENERAL SESSIONS

Place of Meeting—Concert Hall, Royal York Hotel

Wednesday, June 22nd

2.15 p.m.—The rôle of bronchoscopy in the diagnosis and treatment of pulmonary disease—Dr. R. S. Pentecost, Toronto;

Tumours of the Bronchi—Dr. J. C. Meakins, Montreal;

Cancer of the rectum—Dr. Daniel Jones, Boston;

Dr. Donald Balfour, Mayo Clinic, Rochester, (subject to be announced later).

Thursday, June 23rd

2.15 p.m.—Lantern demonstration of ordinary diseases of the fundus of the eye, for the general practitioner—Dr. W. H. Lowry, Toronto;

The relationship of psychiatry to general medicine—Dr. Ralph Noble, New York;

Diaphragmatic hernia—Dr. W. H. Dickson, Toronto.

Friday, June 24th

2.30 p.m.—Symposium on Cancer:

The reaction of tissues to the application of radium—Dr. Burton T. Simpson, Buffalo;

The treatment of carcinoma of the cervix—Dr. Wm. A. Scott, Toronto;

Radium treatment of oral carcinoma —Dr. W. L. Barlow, Montreal;

The treatment of external cancer by radium and x-ray—Dr. G. E. Richards, Toronto.

CLINICS

Thursday, June 23rd

8.30—10.00 a.m.—

Tuberculosis - - Western Hospital (8.30 a.m.—9.30 a.m.)

Pædiatrics - - Sick Children's Hospital

Medicine - - - St. Michael's Hospital

Surgery - - - - Toronto General Hospital Hospital for Sick Children

Obstetrics - - - Toronto General Hospital, Burnside.

Gynæcology - - Toronto General Hospital, Outpatients' Department

Otolaryngology - Toronto General Hospital, Outpatients' Department.

Friday, June 24th

8.30—10.00 a.m.—
Tuberculosis - - Western Hospital (8.30 a.m.—9.30 a.m.)
Pædiatrics - - Sick Children's Hospital
Surgery - - - - St. Michael's Hospital
Sick Children's Hospital
Medicine - - - Toronto General Hospital.

SECTIONAL MEETINGS

SECTION OF ANÆSTHESIA

WEDNESDAY, JUNE 22ND

9.15 a.m.—Anæsthesia in children—Dr. C. H. Robson, Toronto;
The present status of avertin anæsthesia—Dr. Wesley Bourne, Montreal;
Spinal anæsthesia—Dr. Ralph M. Tovell, Mayo Clinic, Rochester;
Post-operative pneumonia—Dr. Wm. Cody, Hamilton;
Intratracheal administration of nitrous oxide—Dr. C. C. Stewart, Montreal.

SECTION OF EAR, NOSE AND THROAT

WEDNESDAY, JUNE 22ND

9.15 a.m.—The treatment of chronic nasal sinus disease—Dr. John G. Hunt, London;
Causes of persistent discharge following radical mastoid operation—Dr. J. K. M. Dickie, Ottawa;
Diagnosis and treatment of intrinsic carcinoma of the larynx—Dr. G. E. Hodge, Montreal.

SECTION OF HISTORY OF MEDICINE

THURSDAY, JUNE 23RD

10.30 a.m.—An account of the early medical practitioners who, after leaving the army, took up practice in Ontario—Dr. Jabez H. Elliott, Toronto;
Dr. J. W. Crane, London,
(Subject to be announced later).
Symposium on collecting antiques and other objects of medical interest. (Five to ten minutes per speaker.)
Medical book plates—Miss E. Poole;
Pewter of medical interest—Dr. P. F. Summerfeldt, Toronto;
Antique medical books—Dr. John Ross, Toronto;
Antique infant feeding utensils—Dr. T. G. H. Drake, Toronto.

SECTION OF MEDICINE

WEDNESDAY, JUNE 22ND

9.15 a.m.—Treatment of pneumonia—Dr. Campbell Howard, Montreal;

Sectional Meetings—*Continued*

Ten years' experience in the treatment of diabetes—Dr. F. B. Bowman, Hamilton;
Myalgia—Dr. Chas. Hunter, Winnipeg;
Heart murmurs—Dr. K. A. MacKenzie, Halifax;
The diagnosis of precordial pain—Dr. John Oille, Toronto;
Treatment of precordial pain—Dr. G. F. Strong, Vancouver.

THURSDAY, JUNE 23RD

10.30 a.m.—Asthma—Dr. George C. Hale, London;
Atypical forms of encephalitis—Dr. A. H. Gordon, Montreal;
Parathyroid—Dr. Ray Farquharson, Toronto.

SECTIONS OF MEDICINE, SURGERY AND PATHOLOGY

FRIDAY, JUNE 24TH

10.30 a.m.—Symposium on Bronchiectasis—
Pathology—Dr. W. L. Robinson, Toronto;
Medicine—Dr. W. P. Warner, Toronto;
Surgery—Dr. R. M Janes, Toronto.
Discussion—
Dr. A. H. Caulfeild, Toronto;
Dr. D. E. S. Wishart, Toronto;
Dr. N. S. Shenstone, Toronto;
Dr. E. W. Archibald, Montreal.

SECTION OF MILITARY MEDICINE

WEDNESDAY, JUNE 22ND

9.15 a.m.—Responsibility of the Canadian medical profession in national defence—Dr. E. S. Jeffrey, Toronto;
The present status of gas in modern warfare—Dr. P. A. T. Sneath, Toronto.

SECTION OF OBSTETRICS AND GYNÆCOLOGY

WEDNESDAY, JUNE 22ND

9.15 a.m.—Pyelitis of pregnancy—Dr. Gordon Foulds, Toronto;
Puerperal sepsis—Dr. W. A. Dafoe, Toronto;
Conduct of labour—Dr. E. K. Macellan, Halifax;
Non-puerperal pelvic inflammation—Dr. John Fraser, Montreal.

Sectional Meetings—*Continued*

THURSDAY, JUNE 23RD

10.30 a.m.—Prolapse—Dr. W. B. Hendry, Toronto;
The use of x-ray in pregnancy—Dr. W. G. Cosbie, Toronto;
Occipito-posterior positions—Dr. J. D. McQueen, Winnipeg;
Some aspects of ovarian dysfunction—Dr. J. R. Goodall, Montreal.

SECTION OF OPHTHALMOLOGY

THURSDAY, JUNE 23RD

10.30 a.m.—Congenital naso-lachrymal obstruction (read by title)—Dr. A. E. MacDonald, Toronto;
The use of contact glasses in conical cornea (read by title)—Dr. Louis Kazdan, Toronto;
Transplantation of the lachrymal sac in chronic suppurative dacryocystitis—Dr. John MacMillan, Montreal;
Glaucoma, indications for operation and after-treatment—Dr. H. Waite, Boston;
Motor anomalies in relation to prescribing lenses—Dr. Conrad Berens, New York;
Trachoma in Canada—Dr. Gordon Byers, Montreal.

SECTION OF PATHOLOGY

9.15 a.m.—Findings of special clinical interest revealed at post-mortem examinations—Dr. W. J. Deadman, Hamilton;
Pigment metabolism and anæmia problems—Dr. G. H. Whipple, Rochester, N.Y.;
The enlarged spleen—Dr. Geo. Shanks, Toronto;
Biopsy—Dr. Burton T. Simpson, Buffalo.

SECTION OF PÆDIATRICS

WEDNESDAY, JUNE 22ND

9.15 a.m.—A few difficult problems in the feeding of infants—Dr. E. A. Morgan, Toronto;
Mumps and its complications—Dr. H. B. Cushing, Montreal;
Tuberculosis in children—Dr. Alton Goldbloom, Montreal;
Some aspects of intestinal indigestion—Dr. Geo. Pirie, Toronto.

SECTION OF PUBLIC HEALTH

THURSDAY, JUNE 23RD

10.30 a.m.—The specific prevention of diphtheria—Dr. J. G. FitzGerald, Toronto;
Discussion—
Dr. Jas. Roberts, Hamilton;
Dr. W. L. Hutton, Brantford;

Sectional Meetings—*Continued*

Scarlet fever toxin, toxoid and antitoxin,—laboratory findings—Dr. D. T. Fraser, Toronto;
Clinical observations on the use of fever toxin, toxoid and antitoxin—Dr. Beverley Hannah, Toronto;
Discussion of Dr. Fraser's and Dr. Hannah's papers—
Dr. Alan Brown, Toronto;
Dr. T. W. G. McKay, Oshawa;
Dr. Chas. Farquharson, Agincourt.

SECTIONS OF PUBLIC HEALTH, PEDIATRICS, OBSTETRICS AND GYNÆCOLOGY

FRIDAY, JUNE 24TH

10.30 a.m.—Care during delivery—Dr. D'Arcy Frawley, Toronto;
Post-natal care—Dr. Gordon Gallie, Toronto;
The prevention of infant mortality during the first few weeks of life—Dr. Alan Brown, Toronto.

SECTION OF RADIOLOGY

WEDNESDAY, JUNE 22ND

9.15 a.m.—Mucosal gastric ulcers—Dr. S. R. Johnston, Halifax;
Multiple myeloma—Dr. W. A. Jones, Kingston;
Cardiac roentgenoscopy—Dr. M. C. Morrison, London;
Intravenous pyelography—Dr. W. C. Kruger, Toronto;
Ulcers of the œsophagus—Dr. W. L. Ritchie, Montreal.

THURSDAY, JUNE 23RD

10.30 a.m.—Diagnosis of acute intestinal obstruction—Dr. W. J. Cryderman, Toronto;
X-ray findings in malignant bone tumours—Dr. A. C. Singleton, Toronto;
Radiographic manifestations of diseases involving the teeth and jaws—Dr. E. H. Shannon, Toronto;
X-ray diagnosis of gall bladder disease—Dr. L. R. Hess, Hamilton.

SECTION OF SURGERY

WEDNESDAY, JUNE 22ND

9.15 a.m.—The management of hyperthyroidism—Dr. Gordon S. Fahrni, Winnipeg;
Sympathectomy in Raynaud's disease—Dr. D. E. Robertson, Toronto;
Sympathectomy in obliterative vascular lesions—Dr. R. I. Harris, Toronto;
The treatment of acute perforative appendicitis, a specific technique—Dr. Fraser Gurd, Montreal;
Gastrostomy—moving pictures—Dr. P. Z. Rhéaume, Montreal.

Sectional Meetings—*Continued*

THURSDAY, JUNE 23RD

10.30 a.m.—Carcinoma of the Stomach—Dr. R. R. Graham, Toronto;
Injuries to the cervical spine—Dr. A. Gibson, Winnipeg;
The operative treatment of spontaneous intracerebral hæmorrhage—Dr. W. G. Penfield, Montreal;
The Gall bladder—Dr. J. W. Ross, Toronto.

SECTION OF TUBERCULOSIS

WEDNESDAY, JUNE 22ND

9.15 a.m.—Koch's discovery of the tubercle bacillus—Dr. W. J. Dobbie, Weston;
A study of infection and disease in contacts with open tuberculosis—Dr. D. A. Carmichael, Ottawa;
Pneumothorax—Dr. C. D. Parfitt, Gravenhurst;
The general hospital and tuberculosis—Dr. D. A. Stewart, Ninette;
Methods of cutting adhesions in artificial pneumothorax—Dr. Norman Bethune, Montreal.

SECTION OF UROLOGY

WEDNESDAY, JUNE 22ND

9.15 a.m.—Treatment of complications of gonorrhœa in private practice—Dr. W. P. Hogarth, Fort William;
Certain cases of hydronephrosis and renal calculi presenting gastro-intestinal symptoms—Dr. Emerson Smith, Edmonton;
The significance of backache in genito-urinary disease—Dr. M. I. Seng, Montreal;

THURSDAY, JUNE 23RD

9.30 a.m.—Some clinical aspects of the prostatic problem—Dr. A. I. Willinsky, Toronto;
Prostatectomy—Dr. Ingersoll Olmstead, Hamilton.
Tumours of the loin—Dr. Warner Jones, Toronto.

LADIES' PROGRAM

An excellent program is being prepared for the entertainment of the visiting ladies, a full account of which will appear in the next issue of the *Journal*.

GOLF

Full particulars with regard to arrangements for playing golf, including play for the two trophies,—The Ontario Cup and the Hamilton Cup, will be published in the next issue of the *Journal*.

Hospital Service Department Notes

PRESERVATION OF HOSPITAL RECORDS AND FILMS

A number of enquiries have been received with respect to the length of time for which hospital records and films should be kept. Although unanimity of opinion is lacking concerning the period of retention, the following information seems to express the general viewpoint.

Hospital records.—The patient's history and the physical findings as well as the laboratory sheet and the treatment sheet should be kept permanently. Nurses' notes are usually kept for one year, sometimes two years. This is advisable for, in most provinces, suit for malpractice against a physician must be instituted within one year of the treatment given and the nurses' notes may contain the only record of doctors' visits, treatments, etc., upon which exhibits the defence might base its case. However, this does not protect the hospital as, in most provinces, there is no special limitation period to protect the hospital itself which can be subject to suit for the statutory period of limitation, usually six years. Therefore, as a measure of protection in this forensically-minded age, no data of legal defence value should be destroyed until the completion of this period. If the history is incomplete and the nurses' notes about the only record made, it might be advisable to keep the nurses' notes indefinitely or until such time as any relative data can have been synopsized on other sheets. If the temperature chart is not of particular interest and is repeated week after week, such sheets may be destroyed at the time of the filing of the records after discharge, at the discretion of the registrar or sister in charge, provided that a note summarizing the chart is substituted.

There is an opinion on the part of many that records should not be kept unduly long, but despite the undesirability of cluttering up the record room with bulky files, it does seem advisable to err on the conservative side when deciding to destroy records. One can never be sure, especially in dealing with surgical cases, when a wire may be received from some distant place requesting information as to whether or not a patient's gall bladder or appendix was removed twenty years previously. To be able to give that information on demand is a service which every hospital should be able to give to its former patients. In cardiac and pulmonary cases it is often very essential that comparisons between findings be made over long periods of time.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, Secretary, 184 College Street, Toronto.

An article on "The Safe-Guarding of Hospital Records" by Dr. George F. Stephens, on page 108 of the January, 1930, issue of the *Canadian Medical Association Journal*, dealt with the protection and custody of hospital records and the right of various individuals to access to these records.

X-ray films.—Here the procedure varies with the type of lesion, the completeness of the x-ray report, and upon whether safety or combustible films are used. It is doubtful if films of fractures or accident cases should ever be destroyed unless there is a very good report on file, and certainly they should not be destroyed until a full year has elapsed after the treatment by the doctor in charge. A report, no matter how good, is not as desirable as the actual film; it is not so acceptable in a court of law and subsequent study of plates often reveals detail not noted previously. Photographic reductions of the plates are preserved by some institutions and for most fracture work these are sufficient, although for chest studies much of the detail may be lost and they are not as effective in stereoscopic studies.

Normal films (non-accident) of patients who have died, and non-accident films of living patients showing pathological changes, are destroyed by many hospitals after an interval varying from two to five years. However, no film should be destroyed without proper record having been made of the findings. This record should be in duplicate at least, one copy being filed in the x-ray department and the other with the history of the patient. The practice of filing the film with the patient's history is not new and is giving those hospitals wherein such practice was begun some years ago considerable concern because of the fire hazard attached to the inflammable film. Even with the new safety films this practice is not good, because it requires the cutting of the larger plates, destroying their stereoscopic value, and it complicates the roentgenological record system.

No films should be destroyed by the roentgenology department without giving the doctors in charge of the cases reasonable opportunity to request the saving of those films which they would consider of value for the patients' records or of scientific interest to themselves. The radiologist and the medical staff should have an opportunity of checking over the films and preserving for the scientific files of the hospital those films which might be of interest in the preparation of future scientific papers. In some hospitals before old films are destroyed they are arranged in lots which are designated to the doctors in charge and the doctors are notified of the proposed destruction of such films, with the request that they check over these films and plates at the hospital before a certain date and indicate those which they wish preserved. If the doctors do not avail themselves of this opportunity by the time limit stated, the hospital will have discharged, at least, its obligation to the medical staff in this respect. However, as pressure of work may prevent the doctors from checking over these films in the time specified, it is advisable to provide a little leeway in the case of chest plates and x-rays of accident cases.

As most hospitals are now using the safety film it is immaterial from the viewpoint of fire hazard where they are stored, the usual practice being to keep in the working file only those films which are those of patients still in the hospital or likely to have follow-up pictures, as, for instance, cases of pulmonary tuberculosis, intestinal obstruction, peptic ulcers, accident cases, etc. It is customary to remove other films from this working file and file them in a more remote reference file where space is not so valuable. Where inflammable films are used or are being stored it is essential that both the working file and the reference files be carefully ventilated. Many hospitals are putting inflammable films in metal cabinets which are unventilated, not realizing that the enclosure of inflammable films in tightly closed files, even though of metal, is a distinct fire hazard, as such procedure is conducive to spontaneous combustion.

OWNERSHIP OF ROENTGENOGRAMS

At frequent intervals letters are received in our Department of Hospital Service requesting information concerning the ownership of x-ray films. These questions usually arise because of the demand of some patient that he or she be permitted to take the films away and the generally accepted opinion of hospital and legal authorities has been that the film belongs to the hospital, the patient paying for the interpretation only.

A recent decision involving the Hurley Hospital, Flint, Michigan, is of interest in this connection. A patient on discharge from the hospital refused to make payment for his roentgenograms unless they were turned over to him. This the hospital refused to do and the patient was sued for the amount due. The hospital lost the case. Because of the principle involved, the Hurley Hospital appealed the case to the Circuit Court. At the hearing of the appeal the decision was reversed and judgment given in favour of the hospital. According to the *Bulletin of the American Hospital Association*, in giving judgment the court pointed out that the hospital sold and patients paid for, not the material that went into roentgenograms but knowledge and experience; the protection of the hospital might depend largely on the proper preservation of the roentgenograms; therefore, the films should remain with the hospital. It might have been added that the retention of the film in the hospital may mean

a great deal to the patient in later life for films not so stored are liable to become lost or destroyed and not available years later when required for reference.

Here and there we still have a few small hospitals in which the x-ray installation is the property of a private physician and the financial remuneration, the up-keep and the filming of indigent patients is a matter of arrangement. It would be well in these instances to have the basis of contract carefully reviewed so that the disposition of the film would be such as to provide adequate protection to the party (doctor or hospital) upon whom or which would fall the legal responsibility of accident or error in judgment.

NEW HOSPITAL IMPROVEMENTS

From the funds of the canteen at the Ontario Hospital (for mental and nervous patients) at Whitby, a miniature golf course has been constructed on the hospital grounds to add to the recreational facilities now provided for the patients at that institution. A beauty parlour for the use of the patients has also been provided.

Special Correspondence

The Edinburgh Letter

(From our own correspondent)

The Prime Minister, Mr. J. Ramsay Macdonald, and Sir James Barrie, O.M., Chancellor of the University of Edinburgh, were associated in a number of engagements in connection with the University during the last week in January. On January 27th Sir James Barrie performed the opening ceremony of the Health Exhibition in the Waverley Market. On January 28th Mr. Ramsay Macdonald and Sir James Barrie were present together, when the former formally inaugurated the new Grant Institute of Geology and the new engineering buildings of the University. Later they were entertained at luncheon in the Old College of the University.

Important developments in the provision of hospital services in the city of Edinburgh will shortly be introduced. Under the Local Government (Scotland) Act, 1929, the Poor Law Hospitals were transferred from the jurisdiction of the Parish Council to that of the Town Council. Co-ordination of the hospital services is, therefore, much more possible than it was under the old arrangement, as now there are only the two types of hospital, the municipal and the voluntary; of the latter the Royal Infirmary is the most important example. Under the new scheme the former Poor Law Hospitals at Craigleith and at Seafield will be converted into General Hospitals and linked up with the present municipal hospitals and the Royal Infirmary for teaching purposes. It will then be possible for this one hospital system to be divided into appropriate units—medical, surgical, obstetrical and pædiatric. The general administration of the municipal hospitals will remain under the control of the medical officer of health for the city, but the appointment of a part-time medical staff will be made jointly by the Corporation and the University, apart from the resident medical officers, who will be appointed by the Corporation. It is suggested that the Corporation should pay to the University annually a sum not exceeding £2,000, to cover the services rendered by the part-time staff. From the point of view of the Corporation and the patients this scheme will be of the greatest advantage, as it will provide the municipal hospitals with the best available medical and surgical skill, of which the Royal Infirmary at present enjoys the benefit. From the point of view of the University the great advantage will be that it will provide greatly extended facilities for the clinical teaching of medical students. The facilities for the training of nurses will also be materially improved. Under this scheme it is hoped to have 750 beds available in municipal hospitals, most of which can be utilized for clinical teaching. A committee representative of the Corporation and the University has been appointed to consider the matter, with Mr. Alexander Miles, M.D., former President of the Royal College of Surgeons, as convener.

A proposal to admit fee-paying patients to the Edinburgh Royal Infirmary has been supported by a majority of the Court of Contributors. The Infirmary's motto for two hundred years has been "patet omnibus", and this has been put forward as an argument against the introduction of the new scheme. It might be urged that times and fashions have changed in the last two hundred years. In the matter of motor car accidents alone, the institution deals with about 500 every year, at a cost of £3,000. Of that amount only £300, or 10 per cent, is recovered, under the Insurance Act. The scheme of paying wards is gradually being introduced in this country. It has already been introduced into many English hospitals and is being tried in the Victoria and Western Hospitals, Glasgow. The Infirmary during its long history has been supported entirely by voluntary contributions, but it has been the custom for patients who wished to express in a practical manner their gratitude for being restored to health to give a donation to the funds of the institution.

Dr. Alexander Murray Drennan, the newly appointed Professor of Pathology, delivered his

inaugural address during the month of January. The subject of Dr. Drennan's remarks was "Reflections on the centenary of the chair of pathology." In the early days of the last century the teaching of pathology was part of the duties of the Professor of Clinical Surgery. In 1831, the subject had developed to such an extent that the Town Council decided to appoint a professor. Dr. John Thomson was the first incumbent. In 1842, he was succeeded by William Henderson, who was credited with being one of the first to distinguish between typhus and relapsing fever. He resigned in 1869, and was succeeded by W. R. Sanders, who had been for a number of years the conservator of the Royal College of Surgeons Museum. In 1881 came William Smith Greenfield who introduced a course of practical pathological histology, a new departure in the teaching of pathology. He was followed in 1912 by James Lorrain Smith who had previously held Chairs in Belfast and Manchester.

The University Court has granted leave of absence for the month of May, 1932, to Professor John Fraser of the Chair of Clinical Surgery, to enable him to accept an invitation of the American Surgical Association to be its guest at the meeting of that Association to be held in New Haven, Connecticut.

Another of the many notable Englishmen who have taught with success in the Edinburgh Medical School, has just died at the advanced age of 88. Dr. Joseph Ryland Whitaker was appointed a lecturer in Anatomy at Surgeons' Hall in 1894. His whole-hearted devotion to teaching left little time for other activities, but he produced a book on the anatomy of the brain and the spinal column which ran to several editions. In spite of his length of service he was not the senior lecturer in the School of Medicine. Dr. Drinkwater who has lectured on Chemistry for over fifty years is his senior by several years.

Dr. John Parlane Kinloch, Chief Medical Officer of the Department of Health for Scotland, died suddenly at the end of January. Dr. Kinloch came from the West, and was a graduate in Medicine of Glasgow University (1909). In 1914, he was appointed Deputy Medical Officer of Health of the City of Aberdeen. In 1923 he became Reader in Public Health in Aberdeen University, and the same year, on the retirement of Prof. Matthew Hay, was appointed head of the Public Health Department. Towards the end of 1928 Dr. Kinloch was appointed Chief Medical Officer of the Department of Health for Scotland, in succession to Sir Leslie Mackenzie. By Dr. Kinloch's death the public service has lost a man of great personal force and of high ability.

GEORGE GIBSON

23 Cluny Terrace, Edinburgh.

The London Letter

(From our own correspondent)

The *Lancet* Commission on Nursing has just issued its report and the representative group whose labours this represents deserves congratulation on the successful conclusion of a painstaking task. Preliminary reports have already been mentioned in these notes, especially as regards the reasons for the shortage of nurses in this country, and the present report, besides dealing more fully with this point, produces positive recommendations as to the future. The system of training nurses in this country has been found satisfactory and has served as a model all over the world. Hence any radical changes would be looked upon as doubtful in principle for this reason alone. What the Commission recommends is rather adaptation of the present system. In the first place it must be realized that the modern young woman gets more freedom in home life and in most of the professions than her sisters of fifty years ago, and the nursing profession ought not to be still back in the Victorian age for its social amenities. This may seem a small matter, but the Commission has no doubt that it bulks large in the minds of those who keep out of nursing. Secondly, the Commission attacks certain economic aspects of nursing. In effect it is conclusively demonstrated that nurses do pay indirectly, if not directly, for their training and this should effectively dispose of a general assumption to the contrary. Closely connected with this is the problem of the domestic, cleaning and polishing work which junior nurses are called upon to do. Such work, it is agreed, could be perfectly well done by ward-maids, and the relief to young probationers would render them fitter to tackle the intellectual work concerned with the large amount of theory they have to learn. The Commission urges that preliminary subjects should be disposed of in institutes outside the hospitals before the real nursing work begins, and, further, the final examinations should be more directed towards nursing and contain less theoretical medicine and surgery. Some of the specimen questions given in the report would floor many a medical student up for his finals! Shorter hours, better pay for senior nurses, improved diet, and many other points are among the constructive proposals of the report which deserves close study.

At last, almost with a flourish of trumpets, at any rate in the popular press, the secret of the "Spahlinger cure" for tuberculosis has been revealed. The revelation is a great disappointment to many, for all that is now public is an account of the details of the preparation of a prophylactic vaccine. After the Lübeck catastrophe it will be difficult to get the public to take kindly to a vaccine even with the power of M. Spahlinger's name behind it, and in any case it is still debatable if prophylactic vaccination for tuberculosis is a practical proposition for human

beings or animals. What M. Spahlinger has not told us anything about is his curative serum with which he has obtained so many spectacular cures. To the bacteriologist, no doubt, there are many ingenious points of interest in the published details of vaccine-making. To the medical profession as a whole it is a great disappointment that the "Spahlinger treatment" is as great a mystery as ever. In any case, tuberculosis is disappearing from amongst us slowly but surely. Even the war years and the post-war years have failed to arrest the steady decline in mortality from tuberculosis, from 3,478 per million population per annum in the period 1851-60 to 932 in 1929. It is generally accepted that an increase in the general standard of living and improved nutrition are among the main causes of this, but is very difficult to pick on any particular public health measure and give it the credit for the improved state of affairs. Indeed, one speaker at a recent discussion on the subject suggested, with approval, that tuberculosis was dying out of its own accord. That being so, curative measures for the remaining cases are more important than artificial preventive measures, and that is why M. Spahlinger is still a disappointment.

The "British Climate" is one of our old-established institutions about which we are inclined to be very touchy. Recent mention has been made of the move to popularize British health resorts in face of a depreciated exchange and climatic factors were naturally fully discussed. By a sort of psychological "defence" mechanism against a possible "inferiority complex" some experts proved that English seaside towns have better and longer sunshine than parts of the south of France, but that has not prevented a certain distinguished invalid from giving up his trial of an English south coast resort after a few weeks of it and making a dash for the Mediterranean shores. A close study of the effect of weather on health might perhaps be wiser than too many sweeping generalizations. The Director of the Meteorological Office has recently been explaining that almost all the effects which the lay mind imagines are due to weather are due to the imagination and nothing else. He thinks that the degree of extraction of heat from the body is the only factor that matters, and this depends upon the humidity of the surrounding air and more especially on its movement. Barometric changes, temperature changes, thunderstorms and other alleged causes for illness are swept overboard along with bad smells, ozone and radioactivity. However, we are left with our "humidity", and perhaps it may be agreed that a race which can live in such environment and survive must be one of the fittest. Such Darwinian comfort is again a subject which may interest the psychologists of other nations.

ALAN MONCRIEFF.

London, March, 1932.

The Irish Letter

(From our own correspondent)

When the Irish Hospital Sweepstakes were first introduced it was thought by many people that the regular sources of income to hospitals participating would be lost. To a very large extent this has occurred, yet the sums accruing to them from the Sweepstake Fund have been so enormous that several hospitals which were on the point of extinction have been able to pay off their debts and have now the prospect of rapidly becoming the wealthiest medical insitutions in the world. The National Maternity Hospital, Dublin, was threatened with extinction because of the decayed state of its buildings, but the £88,000 it has already received has enabled it to budget for the building of a new and modern hospital. The Mater Misericordiæ Hospital, Dublin, is erecting six annexes with accommodation for 300 more patients. The Jervis Street Hospital has paid off a debt of £30,000, and in addition has provided eight new wards, has improved the x-ray and ultra-violet ray departments, and modernized the hospital laboratory. Sir Patrick Dun's Hospital is building a new outpatient department which will cost over £30,000, and a new nurses' home is being contemplated. In addition to these activities the Irish Free State Government has accepted an offer from the Rockefeller Foundation, of a sum of money to establish a State Public Health Laboratory. Such an institution should prove of great value to the medical officers of health in the Free State, as up to now they have had very little laboratory assistance in their work. Advertisements have been published inviting candidates for this directorship of the laboratory, and the successful candidate will be appointed to a Rockefeller Foundation Foreign Fellowship for a year in order that he may study the organization, functions and methods of similar laboratories in America.

Hospital practice in Northern Ireland is also undergoing changes. Under the proposed legislation of the Northern Government the county infirmaries as such are doomed and their places are being taken by a system of regional hospitals. The reason for this change is explained in the circular letter recently issued by the Ministry of Home Affairs (N. I.). At present only three of the county infirmaries can be said to be centrally situated. The County Antrim Infirmary is at the extreme south of the County, in Lisburn, and is most inconvenient for residents in the north and east divisions. Similarly the populous area of North and West Down cannot be served satisfactorily by a county infirmary in Downpatrick, and the Derry County Infirmary situated at the extreme north-east corner of the county is entirely out of touch with the main part of the population of the region which it is supposed to serve. These infirmaries will be brought up to a reasonable standard of modern efficiency and made to serve a surrounding region, while new

hospitals will be built to serve districts which have not at present a satisfactory hospital service.

These hospitals, when they come into existence, will require a large staff of nurses to carry on the work. But even under present conditions there is a serious shortage of nurses. Some authorities think this is at least partly due to the minimum age at which girls are permitted to become probationers: at present it is 19 years, and it seems strange that the minimum age for girls to begin work as medical students is two years younger, *i.e.*, 17 years. At a recent meeting of the Belfast Board of Guardians it was proposed that the age minimum be reduced to 18 years. It seemed to be the considered opinion of the board that many good nurses are lost to the profession and drift into other professions because of the age barrier. It appears difficult to understand why an applicant of 18 years, 5 foot 7 inches in height, and 10 stone in weight should be rejected while another only a few months older, 5 foot 2 inches in height, and probably only 8 stone in weight should be accepted for no other reason than by a regulation of the Board. Red tape can hardly go further.

The medical profession in Northern Ireland has suffered a great loss in the death of James A. Lindsay, Emeritus Professor of Medicine, Queen's University, Belfast. Professor Lindsay was a Fellow of the Royal College of Physicians, London, a physician to the Royal Victoria Hospital, Belfast, since 1882, and for eight years Chairman of the Board of Management of that hospital. He was also Chairman of the Board of Management of the Belfast Maternity Hospital, Chairman of Methodist College, Belfast, and the Chairman of the Belfast Linenhall Library. He was an Ex-President of the Natural History and Philosophical Society and of the Belfast Library Society, both of which owe much to his interest and influence. Professor Lindsay, who had a wide reputation as the author of numerous books and papers on medical science, was noted as a ripe classical and philosophical scholar. He was outstanding in his profession of medicine for more than a quarter of a century, and Belfast and Northern Ireland will be greatly impoverished through the death of this distinguished representative of a family, which, for more than a century, has played a notable part in its religious, professional, commercial and public activities.

The report of the Irish Free State Department of Public Health for the year ended 31st March, 1930, has at last been published. It states that satisfactory progress was made during the year with the county health schemes. The stage of development of these schemes in each county is according to the length of time a county medical officer has been functioning, and the degree of co-operation afforded by the Board of Health to the work of reorganizing the public health services. In Donegal, Galway, Limerick, Meath, Wicklow, Carlow, Cork, Kildare, Louth and Westmeath, county medical officers have been appointed. It is, however, interesting to note that since the close of the period with which the report deals, appointments have been made in seven additional counties, *viz.*, Cavan, Monaghan, Roscommon, Wexford, Dublin, Mayo, and Kerry. In addition a number of assistant medical officers have been appointed.

The incidence of typhus fever showed a decline during the year, no serious outbreak occurring. Enteric fever was more prevalent in rural than in urban districts, which is suggestive of the use of contaminated water supplies in the latter areas. Substantial outbreaks of diphtheria occurred, the notifications showing an increased incidence both in urban and rural areas. Mass immunization for the eradication of this disease is now in operation in several districts where the disease has been prevalent. There was a decline in the number of cases of scarlatina. Six cases of encephalitis lethargica were notified.

The mortality associated with pregnancy and child-birth continues to decline, taking the country as a whole, but there was a high death rate from accidents of pregnancy and child-birth in the rural districts of the counties of Laoighis, Kilkenny and Leitrim. None of these counties had a county medical officer who would have been responsible for the control and supervision of midwives, a circumstance that is regarded as a contributing factor to the excessive mortality.

The number of local authorities administering maternity and child welfare schemes increased by 1 to 30. In addition there were 82 voluntary agencies, as compared with 77 in the previous year. Four of the new schemes were established by the Lady Dudley Nursing Society in Gaeltacht districts.

Infant and child mortality showed a slightly increased incidence, especially in the county boroughs, with the exception of Limerick, which still has the highest rate in the country (116 deaths per 1,000 births).

During the year an approved tuberculosis scheme came into operation in Limerick county borough. In Cork County, following on the appointment of three assistant county medical officers, a tuberculosis scheme was also established. In Meath and Wicklow, where partial schemes were in operation, comprehensive arrangements were made on the appointment of county medical officers. Roscommon, which now has a county medical officer of health, will, it may be anticipated, come into line in the adoption of antituberculosis measures. The only county now in which no satisfactory steps have been taken for combating tuberculosis is Longford.

It has been announced that Sir Frederick Gowland Hopkins, P.R.S., Professor of Biochemistry at Cambridge, has accepted the invitation to deliver the annual Purser Memorial Lecture at Trinity College, Dublin. Sir Frederick is the second lecturer to be appointed under the terms of a gift made in 1930 by Miss Sarah Purser in memory of her brother, John Mallet

Purser, who was King's Professor of the Institutes of Medicine from 1874 to 1901, and Regius Professor of Physic from 1917 to 1925. The first lecture under this scheme was given in 1931 by Sir Edward Sharpey-Schafer, F.R.S., of Edinburgh, who was one of Purser's former colleagues.

RICHARD H. HUNTER.

20 Haypark Avenue, Belfast.

Letters, Notes and Queries

Sodium Malate in Hypertension

To the Editor:

You will find enclosed an item copied from the *Journal of the American Chemical Society*, forwarded to us by our engineering department.

During the past year it has been discovered that the sodium salt of malic acid has a taste practically identical with table salt and may be used as a substitute by sufferers from high blood pressure, Bright's disease, and dropsy, who have been required to omit salt from their food, according to an announcement made by John C. Krantz, Jr., at a joint meeting of the members of the state boards of pharmacy and delegates of faculties of colleges of pharmacy, held in Atlantic City, March 12. Doctor Krantz stated that extensive investigations had shown that the substitution of this salt would satisfy the craving for salt in food, but have no ill effects.

Could you give me any further information concerning this, as regards how much it has been used, if at all, by the medical profession; if it has been adopted by them; if so, where is it possible to obtain it?

R. A. GILCHRIST, M.B.

Ocean Falls Hospital,
Ocean Falls, B.C.,
February 13, 1932.

Answer.—The use of sodium malate for the purpose above suggested is unsound. Œdema seems to be associated with sodium retention and the substance in question is a sodium salt just as much as is sodium chloride.

Sodium malate is probably oxidized in the body to sodium bicarbonate. The administration of sodium bicarbonate in œdema increases the œdema.

In seeking a substitute for sodium chloride in the diet it is necessary to look for something else than a sodium salt. The chlorine fraction of sodium chloride has nothing to do with œdema; hence eliminating it, as is done in the administration of sodium malate, is a matter of no importance.

R. L. STEHLE,
Professor of Pharmacology,
McGill University.

Answers to questions appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

We are indebted to Prof. R. L. Stehle for his comment on the subject. We are sure that sodium malate has not been widely adopted by the medical profession as a remedy for the conditions mentioned.—(ED.)

A New Treatment for Narcotic Patients

To the Editor:

The following clipping from the Associated Press was handed me by a man who honestly would like to get rid of the addiction spoken of in the clipping and asked me to find out if there was any endorsation of the facts mentioned, and I thought by writing you I might find out if this cure has had any medical discussion which you have printed or in the future might print regarding this new treatment. I do not see any mention of the matter in the February edition and would like to be posted by you if you have had any discussion printed or might possibly have an article on it.

Complete breaking up of a morphine drug habit in six days by a treatment new to medicine was reported on January 15th at Cornell University. The patient apparently was completely cured, and with little discomfort.

The treatment is the administration of a compound designed to wash the brain and nervous system clean of the "habit". This habit, under the Cornell interpretation, is due to a thickening of proteins in brain cells, a condition which persists after the narcotic is stopped and which accounts for the continuance of the craving. The new antidote, sodium rhodanate, is a peptizer, or thinner, of the thickened proteins.

The hospital story of this case is to appear in the January number of the *Proceedings of the National Academy of Sciences.* It is told by Wilder D. Bancroft, Ph.D., Robert S. Gutsell, M.D., and John E. Rutzler, Jr.

The morphine patient was a male nurse, an addict for 16 years. Cures had been attempted six times previously, and he had been recorded as a "mean case". The treatment consisted in reducing him in six days from twelve grains of morphine daily to none; and substituting sodium rhodanate for the morphine cuts.

M. E. COMMINS

Bath, N.B.,
February 13, 1932.

Answer.—I have looked up the article you refer to and find that the men who report on the use of sodium rhodanate in the treatment of opium addiction are attached to the Baker Chemical Laboratory of Cornell University and may be taken, we judge, as reliable workers. However, they only report one case which they know of personally in which this form of treatment was employed. They add this:

". . . We understand unofficially that good results have already been obtained on drug addicts by other physicians and who have been testing this theory; but, unfortunately, nothing has been published so far and we have no first hand information as to the results."

The article in question can be found in the *Proceedings of the National Academy of Sciences of the United States of America,* January, 1932, p. 8. You will see that the method of treatment referred to is decidedly in the experimental stage and apparently not very far on. We have not as yet published anything on the subject, and will not do so unless further work is done. EDITOR

X-ray Diagnosis in Medico-legal Cases

To the Editor:

With reference to the paper on "The Value of X-Ray Diagnosis in Medico-Legal Cases" by A. Howard Pirie, M.D., which appears in the February number of the *Journal,* I would say that in this paper Dr. Pirie, while speaking of a divided scaphoid implies, although he does not definitely state, that this bone never develops in two parts. Might I call attention to "A Clinical Atlas of Variations of the Bones of the Hands and Feet" by Thomas Dwight, J. B. Lippincott Company, Philadelphia and London, 1907. In Plates I and II of this book several divided scaphoids are illustrated. One of them, it is definitely stated, was never fractured, this finding being confirmed by microscopic examination made by Dr. E. H. Nichols.

E. F. WOOLVERTON

Woodstock, N.B.,
February 18, 1932.

To the Editor:

In answer to Dr. E. F. Woolverton regarding the development of a scaphoid bone in two parts, I implied in my paper that this bone never develops in two parts. My chief reason for this suggestion is that no divided scaphoid has been reported in a young person, so far as I know. I have been watching for an undoubted case of a divided scaphoid for the last fifteen years, and have not found one. I cannot agree with Dr. Dwight's statement in his book, that the divided scaphoid he illustrates was "never fractured". Finding a fractured scaphoid in a "sprained wrist" is quite common and how many sprained wrists during the last thirty years never came for x-rays, and the patient forgot about the sprain until an x-ray revealed the old fracture. Such cases pass for "divided scaphoids" and the only proof is to find a divided scaphoid in a young person with no history of injury. It would be more convincing to find it in both wrists in this case. Double fracture of the scaphoid is not uncommon.

Dr. Thurston Holland, the doyen of English x-rays, doubts the presence of a double scaphoid.

A. H. PIRIE,
Director, X-ray and Radium Department, Royal Victoria Hospital, Montreal.

The Late Francis J. Shepherd

To the Editor:

I am at work upon a biography of the late Dr. Francis J. Shepherd of Montreal and should be grateful for the opportunity of asking, through your columns, for help from any of your readers who were his house surgeons or students. I should be grateful for the privilege of examining any letters received from Dr. Shepherd, and for any anecdotes or recollections of him. Yours truly,

WILLIAM B. HOWELL.

17, Grosvenor Apartments,
1610 Sherbrooke Street West,
Montreal.

Topics of Current Interest

The Antiscorbutic Potency of Some Citrus Fruits

Certain citrus fruits are now depended on by thousands of persons to supply the antiscorbutic protection that present-day dietary conditions demand. This is particularly true in infancy when pasteurized milk and other foods, notably cereal products, usually compose most of the food intake. Modern studies on vitamins have shown that these essential dietary factors are susceptible to deterioration by various methods of processing and conservation to which our foods nowadays may be subjected in the industries and even in the home. The sources of the vitamins also vary in their yields with respect to the species of plant, the degree of ripeness or maturity, the method of cultivation and perhaps other features. How easy it is to err by making untested generalizations has been shown, for example, in the contrast between the lemon and the lime (*Citrus medica* var. *acida*), the latter possessing a definitely lower antiscorbutic activity, although for many years such differences were not appreciated, and lime juice was rated as an antiscorbutic *par excellence.* The sharp division in antiscorbutic activity among closely related fruits is quite striking. Recent studies* at the Lister Institute in London on variations in the vitamin C content of oranges picked from the same trees (in Palestine) at different times of the season during two consecutive years, and likewise of grapefruit picked at different times in British Honduras and in South Africa, are therefore of interest. They show that the potency of the juice as an antiscorbutic is the same whether the orange or

* Bracewell, M. F., and Zilva, S. S., Vitamin C. in the Orange and the Grapefruit, *Biochem. J.,* 1931, **25:** 1081.

grapefruit is picked at the beginning or at the end of the season. There is no marked loss in the vitamin content when the fruit is stored under ordinary conditions at about 15 C. for about two months. Furthermore, the conditions of cultivation, origin of the stock, age of the trees, and the soil apparently do not materially modify the vitamin C content of the fruit. This information is satisfying in indicating the dependence that may apparently be placed on some of the most widely used antiscorbutic foods regardless of their agricultural history.—*J. Am. M. Ass.*, Jan. 23, 1932.

Vitamin Standards

The vitamins enjoyed an important rise of status when they became the subject of a conference called in London last June by the League of Nations Health Organization, in connection with the meeting of the Permanent Commission on Biological Standardization. Here was a case of wise foresight; before the chaos of varying standards, whether of substances or of animal units, had time to develop in different countries, international cooperation came into play to secure such unity as might already be possible. Clearly all the vitamins could not yet be dealt with, but what one might call the senior group—vitamins A, B_1 (antineuritic), C, and D—seemed ready for consideration. Those attending the conference were a small group of the biggest figures in the purely scientific field, and they came well prepared with data, abundant and to the point. Though it had looked beforehand as if some of the problems might prove to be knotty ones—the relative claims, for instance, of cod-liver oil or irradiated ergosterol to be standard substance for vitamin D, and the suitability or otherwise of carotene to be the standard for vitamin A—yet, in fact, nothing could have been settled more smoothly, and the fruits of the conference's deliberations are now embodied in a terse unanimous report. For vitamin A, carotene, prepared and preserved in a special way, is provisionally adopted as a standard substance, with cod-liver oil as a provisional second string. For vitamin D, a certain solution of irradiated ergosterol is recognized. For vitamin B_1, an adsorption product from a specially prepared extract of rice polishings; and for vitamin C, lemon juice. The methods of preparation are carefully specified, and also the amount of the substances whose vitamin value is to be reckoned as the unit. Scientific institutes are designated which shall be responsible for preparation and distribution of the standards, and lines of further research, against a future meeting of the conference in about two years' time, are indicated. International cooperation has seldom found a happier expression, while at the same time affording us the opportunity to behold in the flesh such legendary figures as Harry Steenbock and Elmer V. McCollum.—*The Lancet*, 1931, **2**: 1144.

Smoking and Endurance

Profiting by the opportunities afforded by the three-mile cross-country run held at the end of every physical training assistant-instructors' course at Aldershot, T. F. Kennedy* has studied the influence of smoking on the endurance of the runners. During ten years nearly 2,000 men were observed. These were graded into non-smokers, moderate smokers (those taking the equivalent of less than 20 cigarettes a day), and heavy smokers (those taking the equivalent of 20 cigarettes or more a day). The numbers in the various groups were: non-smokers 345, moderate smokers 1,461, and heavy smokers 167. Of the non-smokers 18.8 per cent were amongst the first ten to arrive home in the three-mile race, while the corresponding percentages for the moderate and heavy smokers were 8.6 and 6.0 respectively. Further, a study of the last ten men to finish the race each year showed that only 4 per cent of the non-smokers were in this group, but 11.4 per cent of both the moderate and heavy smokers. These figures obviously suggest that smoking reduces physical endurance, which is highly probable; but they must be qualified by the recollection that would-be athletes often eschew tobacco, while their weaker brethren take to it very readily.—*The Lancet*, 1931, **2**: 1419.

Dangers to Health from Soot and Smoke

The Scottish branch of the National Smoke Abatement Society held its annual meeting in Dundee on May 6th, under the presidency of Mr. T. G. Fraser, convener of the Public Health Committee. Dr. Elizabeth C. Mudie, who read a paper on coal, smoke, and cancer, said that tables compiled under the auspices of the Cancer Research Institute in London showed that occupations involving the handling and inhalation of soot and tarry products had a high cancer incidence. Domestic soot contained forty times as much tar as that from the factory boiler chimney, and this might explain the relative immunity enjoyed by the primitive races and in the Middle Ages as compared with that of present-day civilization. She considered that it was desirable to abolish the coal fire, which first implanted disease and then, by lowering resistance, impaired the powers of combating it. Mr. Thomas M. Ash-

* *J. Roy. Army Med. Corps*, December, 1931, p. 451.

ford, smoke inspector, Glasgow, read a paper on the control of industrial smoke. He thought that the solution of the problem of obtaining a pure atmosphere lay in the extensive employment of electricity for power purposes, greater use of mechanical stokers in steam boilers with large plant, and in the substitution of smokeless fuel in furnaces where mechanical stoking was not suitable. In his opinion it would be necessary to bring the furnaces of metal works and domestic sources of pollution under appropriate legislation.—*Brit. M. J.*, 1931, **1**: 863.

Man's Atavistic Tendencies

Dr. Leonard Williams, in a paper on "Man's atavistic tendencies," which he read before the Insurance Institute of London, attributed man's possession of speech, his transcendental brain, and his sense of beauty, particularly female beauty, to his decision to walk on two legs instead of four. If man had remained a quadruped he would not have been able to develop his central nervous system, which was the seat of such god-like qualities as he might justly claim to possess. Man began life as a quadruped, and that was how he intended to close it.

Nothing was so characteristic of premature ageing as a progressive stiffening in the neck and the small of the back. The man of fifty who moved his head and shoulders in one piece was on the down grade, both physically and mentally. A peculiar forward rigidity of the head and neck (called a "poke") was, in his young days, regarded as a mark of special sanctity. Dr. Pusey, one of the principal leaders of the Oxford Movement, had this "poke" by nature, and his younger disciples adopted it as an outward and visible sign of their inward and spiritual grace. It probably shortened their lives as definitely as it narrowed their outlook and clouded their understanding. Whatever external methods they might wish to adopt to impress people at a glance with their virtue, their learning, or their wit, he (Dr. Williams) advised them on no account to do anything which could possibly interfere with the free mobility of the head or neck, and thus imperil the drainage upon which so much depended. At the moment the commonest way of impairing that drainage was by a tight collar.

Ears without lobes and ears with points near the upper part of their margin were definite signs of degeneration. The pointed tip represented that found in many of the lower animals, and it might be taken to reveal various vicious tendencies, most of them with a sinister sexual significance. Ears which were very large or very small, ears which stood out at right angles from the head or were plastered against the cranium, ears which were devoid of nooks and crannies, looking as if they had been ironed out, and ears which were situated either too high or too low in relation to the eye, all told of atavisms or reversions or arrested developments representing certain degrees of degeneracy. Dr. Williams said he was using the term degenerate in a purely physical sense to denote a state of matters which fell unduly short of the optimum in the physiological make-up of the individual, so that a person decorated with such stigmata might be regarded as more liable to succumb to disease and more likely to wear out his organs by legitimate use than his more normally equipped brother.—*The Weekly Times*, Jan. 14, 1932.

Robert Knox On the Stage

Although "The Anatomist", which is now being played at the new Westminster Theatre, expressly lays no claim to historical accuracy, it does give a lively and not unconvincing portrait of one of the more remarkable figures in medicine. Robert Knox was born in Edinburgh in 1791, graduated in 1814, and almost at once went out to a military hospital in Brussels, where he tended the wounded from Waterloo. Gazetted to the 72nd Highlanders, he sailed with his regiment to the Cape in 1817, where he rode an Arabian mare for 90 miles at a time without apparent fatigue. He took a year's study-leave on the Continent in 1821, enjoying the friendship of Cuvier and other savants in Paris, and in 1822 was placed on half-pay at his own request. John Barclay had recognized in Knox a worthy disciple, and in 1825, the year before he died, offered him a partnership, when he began to lecture on anatomy with a success that was astounding, for so popular were his demonstrations that two-thirds of the medical school came to them. It was this very success that led to his undoing, for he constantly needed anatomical material which was then hard to come by, and this need led to his association with the infamous Burke and Hare. Just over a century ago Burke was hanged, his body being handed over to the anatomical theatre which he had supplied, and public odium fell on Knox, who would seem to have made no inquiry as to the origin of the bodies which arrived so opportunely and at such short intervals. Mr. James Bridie's play tells the story of the murder of Mary Paterson, which was one of the charges in the indictment against Burke, but fell to the ground owing to lack of evidence. The horror of the scene in the Three Tuns Tavern when she fell to the "sack-em-up" men is mitigated in the play by the tenderness of her relations with the drunken demonstrator of anatomy, who is thereafter haunted by the memory of her charm. The acting is on a plane of tragedy which is relieved by lighter touches without sinking into melodrama. Henry Ainley makes of Knox a wayward and capricious hero with a touch of real nobility. The play is a piece of medical history which will interest members of the profession.—*The Lancet*, 1931, **2**: 863.

Abstracts from Current Literature

MEDICINE

Raynaud's Disease: A Critical Review of the Minimal Requisites for Diagnosis. Allen, E. V. and Brown, G. E., *Am. J. M. Sc.*, 1932, **183**: 187.

The authors review in some detail the original observations of Raynaud on the disease which bears his name, discuss subsequent relevant literature, and comment upon the frequency with which other vascular diseases are mistaken for it, notably thrombo-angiitis obliterans. They have selected 25 reported cases of Raynaud's disease which in their opinion were incorrectly diagnosed. Reasons are given in each instance for challenging the diagnosis. The authors emphasize that the clinical requirements for the diagnosis of Raynaud's disease are still those laid down by Raynaud, namely: (1) gangrene or trophic changes limited in a large degree to the skin; (2) symmetrical or bilateral involvement; (3) absence of evidence of occlusive lesions of the peripheral arteries; and (4) intermittent attacks of changes in colour which usually precede the trophic changes by months or years. They point out that the disease is largely one of the female sex and that many instances in males subsequently turn out to be due to diseases which may cause vasospastic symptoms, such as arthritis, neuritis, cervical rib, thrombo-angiitis obliterans, arteriosclerosis, or such like. The authors fear that, unless due caution is exercised, operative measures on the sympathetic nerves, which induce a high percentage of cures in properly diagnosed cases of Raynaud's disease, may be subjected to undue criticism and fall into disrepute.

E. S. MILLS

Pregnancy in the Course of Leukæmia. Kaplan, I. I. and Connery, V. E., *Am. J. M. Sc.*, 1932, **183**: 209.

Kaplan and Connery report the case of a woman under treatment for chronic myelogenous leukæmia, who became pregnant, went to term, and was delivered of a normal healthy child. The woman was 26 years of age and had had two children. The first symptoms of the disease made their appearance 15 months prior to her hospital admission on October 22, 1928. At the time of admission she had slight secondary anæmia, a leucocyte count of 122,800, a huge spleen, and some cutaneous hæmorrhages. Under deep x-ray therapy of the spleen the leucocytes were reduced almost to normal levels; she felt generally improved and was discharged but continued the x-ray treatments. In December, when the leucocytes were normal in numbers, she became pregnant. The course of the pregnancy was not unlike previous pregnancies, except for purpura and a threatened abortion in the month of April. The child weighing 7 pounds 10 ounces was delivered in September, and was normal clinically and hæmatologically. As regards the mother, the disease did not appear to be influenced favourably or unfavourably by the pregnancy. X-ray treatments of the spleen during pregnancy maintained the leucocytes at their previous level.

The case is of interest because the number of reported cases of leukæmia complicating pregnancy is small, because of the lack of unanimity of opinion regarding the transmissibility of the disease to the child, and because pregnancy is said to aggravate the disease and anticipate the fatal outcome.

E. S. MILLS

The Prognostic and Social Significance of Cavities in Pulmonary Tuberculosis. Fischel, K., *Am. Rev. Tuber.*, 1931, **24**: 461.

Fischel's paper is a review of current opinions on the subject of cavitation in pulmonary tuberculosis, and in it he presents adequate reason for the increasing importance paid to the vomica in the tuberculous lung. Statistics are given to show how adversely the prognosis is affected by the presence of cavities. One large series showed the mortality incidence of pulmonary tuberculosis to be 90 per cent at the end of five years—a rather discouraging figure. Although cavities occur in lungs with considerable infiltration, this is by no means invariably so, and they may be found in early cases which show only a few small areas of disease. Their presence must be sought, therefore, in all instances of pulmonary tuberculosis.

In his discussion, Fischel adopts Pinner's classification of cavities. This grouping is essentially a pathological one, and fortunately can be applied to the roentgenological changes seen in pulmonary tuberculosis. The three types of cavities described by the author are the small "honeycomb" cavities, the round or oval cavities, and the irregular, thick-walled cavities. The first group is usually found in areas of dense tuberculous consolidation, so that the mass may be riddled with numerous small vomicæ, which may coalesce in time to form large cavities. The x-ray recognition of the small cavities is not difficult. The prognosis is poor unless some form of compression therapy is adopted early. The second group of oval or round cavities may be the consequence of an advancing process in cases of the previous group. The cavities belonging to the second class appear as fairly large, punched out, rarefied areas on x-ray film. In contrast to the third group, the round cavities do not possess a thick wall, which is perhaps the chief feature

of differentiation between the two. The third group consists of the irregular thick-walled cavities. A good many of these may be the final result of the thin-walled cavities which have failed to heal. The walls of the cavity then become lined by a thick, unyielding, cartilaginous membrane, which often prevents collapse of the cavity following even surgical procedures. It is an old observation that cavities as seen on the x-ray film may migrate from one portion of a lung towards the apex. The author explains this by atelectatic or fibrotic changes which may produce traction on that part of the lung with the cavity.

Treatment is discussed briefly, although no new ideas are offered. The mainstay of treatment in cases of pulmonary tuberculosis with cavitation, particularly when one is dealing with thin-walled cavities, remains some measure which will collapse the lung and also the cavity. Non-collapsible cavities will tax the ingenuity of the thoracic surgeon, and then "The treatment of pulmonary tuberculosis is to a great extent the treatment of cavities."

J. FEIGENBAUM

The Large Q-Wave of the Electrocardiogram: A Correlation with Pathological Observations. Feinchel, N. M. and Kugell, V. H., *Am. Heart J.*, 1931, **7**: 235.

The authors present a report correlating a large Q-wave in lead III of the electrocardiogram with pathological findings. The statistics show that a large wave in any lead is unusual, except in cases of myocardial infarction consequent upon coronary artery disease, and their findings indicate that it is associated with damage in the septum, particularly in the posterior portion, its frequency probably being dependent upon the proximity of the septum to the most frequent sites of infarction. It is pointed out that a large Q-wave is the most frequent electrocardiographic sign during the chronic period of myocardial infarction, and sometimes is the only clue to the pathological condition in the heart. A theoretical interpretation of the production of the large Q-wave is presented.

W. H. HATFIELD

The Clinical Value of the Ventilation Test in the Estimation of Cardiac Function. Harrison, T. R., Harris, S. and Calhourn, J. A., *Am. Heart J.*, 1931, **7**: 157.

This report is a sequel to a previous paper which described a method of estimating cardiac function which was dependent on the fact that upon the performance of exercise the degree of dyspnœa produced is directly proportional to the ventilation and inversely proportional to the vital capacity. The results of applying this test to 21 normal people and 74 patients is reported. A ventilation index is obtained after making correction for body weight. This test appeared to have definite clinical value in those patients who had both organic and functional disorders referable to the heart, giving information regarding prognosis and treatment unobtainable by any other method. It has little or no value in determining the presence or absence of organic heart disease. Repeated tests are essential. In conclusion, it is stated that the chief value of this test is in research, as it provides a method for determining quantitatively the effect of various therapeutic measures on dyspnœa.

W. H. HATFIELD

On a Frequently Observed Syndrome in Commotio and Contusio Cerebri. Maun, L., *Deutsche med. Wchnschr.*, 1931, **2**: 2172.

The author comments upon the fact that nervous symptoms of a functional character are so common following cerebral concussion that clinicians have forgotten that organic nervous phenomena may and do occur. Many of the features in the post-concussion symptom- complex are undoubtedly of a functional or psychic character. He describes a syndrome which he has observed frequently during the past year:—

(1) Unilateral disorder of eye movements. This may take a variety of forms. There may be inability of the eyes to follow an upheld finger towards the affected side. There is not a true paralysis but only a difficulty of eye movements which vary with the position of the head. A unilateral nystagmus may occur or, perhaps, only a nystagmoid twitching. Turning of the eyes toward the affected side may cause feelings of dizziness. Subjective sensations of inability to see on one side, with vertigo, occur. (2) Swaying movements towards the affected side when the eyes are closed. (3) Relaxation of the homolateral limbs, especially the upper. (4) Absence of pendulum motion of the arm on the affected side when the patient walks. This objective sign, described by Wartenberg in lesions of the cerebellum, occurs in many post-concussion cases. (5) Diminution of hearing on the affected side, *i.e.*, the side with deficiency in ocular movements. This is an inner ear deafness. Stimulation with the galvanic current shows a hypersensibility of the vestibular apparatus on the same side and may produce dizziness or staggering—the Babinski ear phenomenon. (6) Diminution of the corneal and nasal mucous membrane reflexes on the affected side. (7) A general increase of vasomotor excitability, tachycardia, and cerebral congestion often are present. In a small number of cases there has occurred an increase in the pressure of the cerebro-spinal fluid.

According to Maun, there is apparently an incoordination between the eye muscles and the body muscles. The largest factor in producing this is a disturbance in the cerebellum or in the cerebellar tracts. The frequency of cerebellar signs and symptoms in cerebral concussion cases has lead Schück to attribute all things to cerebellum or brain-stem disturbances. The author does not agree with Schück's theory, however. He attributes great importance to disturbances of the restiform body which lead to incoordination. Disorders of the striæ acusticæ and tuberculum acusticum may lead to auditory disturbances, and disorders of the fifth nerve nucleus, to alteration of the corneal and nasal reflexes. H. A. DAVIS

A new familial Malady characterized by a Congenital Cataract and an Arrest of Somato-neuro-psychic development. Marinesco, G., Draganesco, S. and Vasiliu, D., *Archiv. of Neur. & Psychiat.*, 1931, **26**: 854.

The condition described is a familial one, affecting several children in a family in which there is no previous history of the disease. Thus it behaves as if due to a pair of recessive factors. It is characterized by appearance of cataract, a retardation in somatic and mental development, and a hypocalcæmia. This last feature was also present in some of the members of the family who were normal. The authors discuss the possibilities of interpretation: (1) a primary endocrine disturbance with cerebral manifestations; (2) a maldevelopment of the cerebrum with secondary endocrine dysfunctions; (3) a simultaneous disturbance in both the nervous and endocrine systems.

The Wassermann reactions were negative in all four children, but the Prunell reaction, which is considered as specific for congenital syphilis, was positive in three of the four affected persons. The eldest child, of 18, showed a bodily development comparable to a child of 8 or 9; there were no pubertal changes; bilateral cataract and a slight horizontal nystagmus were present. The muscles were hypotonic; motor activity was decreased markedly; walking was almost impossible; sensibility was normal. Mentally, the patient could carry out simple commands. The second child, a boy of 17, was identical in condition with the older child. He showed bilateral cataract, immobility, inexpressive face and imbecility. The third child was 8, and in him the picture was the same. A biopsy of the frontal lobe was done on this patient, and the cellular picture was one of degeneration rather than an inflammatory reaction. The last child to be affected was 4, and she had not yet acquired the facility of standing alone.

MADGE THURLOW MACKLIN

SURGERY

Mediastinal Emphysema. Jessup, P. M., *Arch. Surg.*, 1931, **23**: 760.

Only a few cases of this lesion have been reported in the English literature. Due emphasis has not been placed on the significance of this complication which may occur in a great variety of diseases. Many of these cases end fatally and the true case is only determined at autopsy. The application of suitable treatment might in some cases have prevented death. There are certain pathways by which air can reach the mediastinum in an amount sufficient to increase mediastinal pressure.

The author reports 7 cases of mediastinal emphysema. Two of these followed automobile accidents; 1 an operation for pulmonary abscess; 1 followed spontaneous tension pneumothorax in a patient with pulmonary tuberculosis; 1 after an explosion during the administration of ethylene anæsthesia; 1 followed enucleation of a mediastinal tumour and the inflation of the lung with air; 1 occurred during an operation for splenectomy when the diaphragm was accidentally incised. The symptoms of mediastinal emphysema were much the same in all cases with the sudden onset of respiratory embarrassment, marked dyspnœa, cyanosis and rapid pulse, and low blood pressure. Subcutaneous emphysema occurred in most of the patients.

Treatment consists in either controlling the source of the air or in giving an outlet to the air already accumulated. Surgical closure of a rent in the lung or the bronchus may be performed, or air-tight closure of sucking wounds, or, again, by diversion of pneumothorax air to the exterior by the insertion of a valve drain. The second method is by making an incision of the skin at the point where a subcutaneous emphysema is originating thus preventing a rapid extension of the process. Narcotics may be given to ensure rest. There have been several cases where recovery has been reported following incision of the skin about the neck, which allows the air to escape.

G. E. LEARMONTH

Primary Carcinoma of the Jejunum. Harris, F. I. and Rosenblum, H., *Arch. Surg.*, 1931, **23**: 805.

This lesion is of rare occurrence. It has been estimated that the incidence is approximately 1 per cent of all intestinal carcinomata. It occurs about twice as often in men as in women. The patients are usually younger than those who develop carcinoma elsewhere in the intestines. The growth is nearly always adenocarcinomatous and rarely of a colloid type. Metastasis to the regional retroperitoneal

lymph-nodes occurs relatively late. There may be metastasis to the ovaries. A diagnosis of carcinoma of the jejunum may be considered in the presence of colic in the upper part of the abdominal midline, associated with vomiting, more particularly if the vomitus is bile-stained. Blood appearing in the stools is important and suggestive. Roentgen examination shows delayed emptying of the stomach, dilatation and atony or stenotic peristalsis in the occluding type, and sometimes a frank defect in outline. There is a diminution or absence of hypochloric acid due to the regurgitation of bile. Radical or palliative surgical treatment is requisite, either resection or gastro-enterostomy, the latter to give relief from obstruction. The mortality is close to 40 per cent with either operation. Radical operation should be the one of election for several reasons: (1) regional lymph-nodes appearing at the operating table to be carcinomatous are frequently only inflammatory; (2) the spread of the growth is essentially slow; (3) the immediate mortality has been shown to be no greater and (4) removal of the primary focus may cause a retard action or retrogression of metastases. The radical operation offers a 16 per cent chance of cure. Earlier diagnosis would improve this percentage, since the growth spreads slowly and is rather easily removed in early uncomplicated cases. Due to the insidious manner of growth the non-occluding type of carcinoma gives a poor outlook. The authors report a case of advanced carcinoma of the jejunum.

G. E. LEARMONTH

Retroperitoneal Tumours. Cohn, I., *Arch. Surg.*, 1931, **23**: 655.

The tumours which Cohn discusses are: (1) retroperitoneal lymphoblastoma (Hodgkin's type); (2) lymphosarcoma; apparently originating in the retroperitoneal glands; (3) metastatic tumours of the retroperitoneal lymph glands following teratoma of the testicle; (4) retroperitoneal sarcoma secondary to sarcoma of the thigh; and (5) retroperitoneal sarcoma. In the case of retroperitoneal lymphoblastoma of the Hodgkin's type the patient had been under observation for six years. When first seen in 1924 his chief complaints were digestive disturbances, severe abdominal pain, more marked in the right iliac region, sour eructations, nausea, vomiting and violent abdominal cramps of short duration. Similar attacks had been present for twenty years. Roentgenological examination demonstrated a marked pylorospasm and a forty-eight hour colonic stasis. An appendicectomy was performed. This operation was followed by a stormy convalescence. For four years the patient continued to have gastric disturbances, until, in 1929, a cholecystectomy was done, following which operation he had a protracted febrile course and a marked loss of weight. Pus was found in the urine. He developed a progressive anæmia. Persistent vomiting was present. Fluid could only be supplied by hypodermoclysis and intravenous injections. At all times the abdomen remained soft. The liver was not palpably enlarged. There was no jaundice. An exploratory laparotomy was performed to determine whether there was an area of infection in the vicinity of the cystic duct or near the head of the pancreas. No lesion was found. The patient succumbed a few days after the operation. At post-mortem examination large retroperitoneal glands in the vicinity of the stomach, pancreas, and duodenum were found, also an ulcerating lesion of the stomach. Microscopical sections from these tissues revealed a lymphoblastoma of the Hodgkin's type, with many large cells of the Dorothy Reed type.

The second case was one of retroperitoneal lymphosarcoma and chylothorax. This occurred in a woman of 46 who one year before examination developed enlarged cervical glands. In twelve months' time the axillary, inguinal and epitrochlear glands had become enlarged. She had progressive loss of weight, digestive disturbances, orthopnœa, vomiting and progressive enlargement of the abdomen, and marked weakness. Hodgkin's disease was considered. Biopsy revealed lymphoblastoma not characteristic of Hodgkin's disease. Owing to the continued presence of fluid in the pleural and peritoneal cavities repeated thoracenteses and paracenteses had to be done. A total of nearly 12,000 c.c. of chylous fluid was removed from both pleural cavities during the course of the disease. At autopsy enlarged tumours of the mediastinal lymph glands were found. The retroperitoneal lymph-nodes were enlarged. Following up the thoracic duct tumour masses were found at intervals along its entire course which had restricted the free flow of lymph. The spleen and kidney contained secondary growths. The anatomical diagnosis was lymphosarcoma, primarily in the retroperitoneal lymph-nodes.

The third case was a retroperitoneal sarcoma secondary to sarcoma of the thigh. The fourth case was one of retroperitoneal sarcoma without metastases, while the fifth was a teratoma of the testicle with retroperitoneal metastases.

G. E. LEARMONTH

Some Effects of Trauma on the Nervous System. Hinds-Howell, C. M., *The Lancet*, 1932, **1**: 115.

The author, after presenting histories typifying cases of extradural, subdural and subarachnoid hæmorrhages, considers the remote effects of head injuries. The most prominent

of these effects are paralysis, epilepsy, mental disorders, ranging from insanity to the more minor of impairment of memory, and irritability of temper, including severe headaches, also the group known as traumatic neurasthenia.

The epileptic attacks may range from the frank Jacksonian type or the idiopathic variety, with grand mal and petit mal attacks, or the epileptic equivalents, such as vertigo, attacks of uncontrollable temper, and memory lapses. These more minor ones frequently occur before the development of the typical seizures. The period between the injury and the first fit varies greatly. One case recorded occurred twelve years after the injury and was cured by the removal of a cicatrix. The author states that it is important to remember that injury to any part of the brain may cause epilepsy with no involvement of the motor cortex. Either subdural or extradural blood clot or pressure from a depressed fracture may cause epilepsy. The group due to a cicatrix manifests fits more or less after long intervals, the hæmorrhages and foreign bodies, after shorter intervals. The author states that concussion with no evidence of gross damage to the brain, fracture or hæmorrhage may act as an excitant of epilepsy, but that in such a case it seems likely that there is an individual predisposition. Alcoholism or severe emotional shock associated with the injury may also be a cause. He does not believe that traumatic neurasthenia differs from neurasthenic symptoms due to any other cause, and that the development of the condition does not depend on the severity of the injury.

In speaking of the effects of injury on the spinal cord he does not disapprove of operating on severe injuries, but feels that it offers little hope. Hæmorrhage may result from indirect violence. This may be either external to or within the spinal cord. In the latter case the common site for such hæmorrhage is the cervical enlargement, when symptoms resembling a syringomyelia, at any rate from the motor and sensory aspect, are probable.

Hæmorrhage outside the cord gives rise to muscular weakness from pressure on the anterior roots and pain from irritation of the posterior roots.

Circumscribed serous meningitis may follow injuries of the cord. The result is a cyst-like collection of fluid, which is probably due to adhesions in the subarachnoid space.

Under "General Nervous Disorders" he cites cases of tabes dorsalis and general paresis following acutely an injury or shock in a patient who has syphilis. These injuries need not be head injuries. He cites another case in which paralysis agitans followed an injury.

W. L. GRAHAM

PATHOLOGY AND EXPERIMENTAL MEDICINE

Experimental Referred Pain from the Gastro-Intestinal Tract. Part II. Stomach, Duodenum and Colon. Bloomfield, A. L., and Polland, S. W., *J. Clin. Invest.*, 1931, **10**: 453.

In this paper, the authors continue their investigations into the pain-producing mechanism of the gastro-intestinal tract, with particular reference to the stomach, duodenum, and colon.

As regards the stomach, the intragastric rubber balloon was fashioned to conform with the shape of the stomach, and was inflated in much the same manner as was the œsophageal bag. Sixteen patients were employed in these experiments. The character of the referred sensation from stomach inflation was very indefinite, that is, it was differently described by various patients. Here, as in the case of the œsophagus, the sensation was not always "painful". It supervened after about 500 c.c. of air had been introduced, and when the pressure in the balloon was about 40 millimetres of mercury. The induced discomfort in the case of the stomach was much more diffuse and could be localized much less precisely than was possible with other parts of the digestive tube. The "stomach area" on the surface of the body was confined to a rectangle in the epigastrium, bounded by the xiphoid and umbilicus above and below, and by what appeared to be the projections of the mammary lines on each side. Twelve patients were utilized to study the effects of inflation of the duodenum. The pain was not strictly described by all the patients in quite the same manner. The pain was referred to an elliptical area covering part of the epigastrium and the right upper quadrant. Between 40 and 200 c.c. of air were required to elicit the pain. In a few cases the discomfort produced was much the same as the spontaneous pain resulting from a lesion of the duodenum.

Nine experiments are reported in which the colon was inflated and the subsequent sensations analyzed. The rectum, sigmoid, and decending colon were the only parts of the large bowel accessible to the balloon. The character of the discomfort was the same as that obtained by inflating the œsophagus, stomach and duodenum. In 6 patients the pain was experienced over various areas in the left lower abdominal quadrant, while in the remaining 3 patients a little pain was complained of in the right lower half of the abdomen.

J. FEIGENBAUM

Blood Sugar and Acid Base Equilibrium in Surgical Diseases. Kingreen, O., *Archiv. f. klin. Chir.*, 1931, **168**: 228.

The diagnosis of a state of acidosis cannot be made only by estimation of the acid bodies in

the blood and urine, for, as Frank has pointed out, such acids can be mobilized in the body itself to compensate alkalotic conditions. Although uncompensated acidosis may be seen by the surgeon in severe diseases, any pronounced change of the acid-base equilibrium of the body is imcompatible with life. A diminution of the alkali reserve is found in diabetes, starvation, and in disturbances of the circulatory, respiratory and renal systems. It is present, also, in severe shock, anæsthesia, operative trauma and after the administration of morphia. The alkali reserve may reach very low limits and remain there. On the other hand, the patient may be swung in the opposite direction into a state of alkalosis. It should be more widely known that a shift of the alkali reserve of the body favours thrombus formation. In severe surgical infections the lowering of the carbon dioxide combining power of the plasma with a raised blood sugar level is of bad prognostic significance. An acidosis is not, of necessity, accompanied by an increased sugar content of the blood and vice versa. The hyperglycæmia which may accompany toxic or infective processes may be due to their effect upon the liver or pancreas. In a series of experiments Kingreen found that the carbon dioxide combining power of the blood plasma was lowered in the veins leaving a point of infection. The author believes that the level of the blood sugar and the alkali reserve give an excellent index of the patient's prognosis and that pre-operative estimations should be made. In his own experience, a high blood sugar with an acidotic tendency was serious.

H. A. DAVIS

The Break-down of Sugars in the Intestine by B. coli. The Etiology of Pernicious Anæmia. v. Knorr, K., and collaborators, including Prof. A. Koranyi, *Fol. Hæmatolog.*, 1931, **43**: 32.

This paper opens out with a careful study of the strains of *B. coli* isolated from 25 persons in whom there was no abnormality in the blood picture, and the stools apparently healthy. They were classified into those with normal acid secretion, hypochlorhydria, hyperchlorhydria and achylia. One hundred strains were isolated, all differing in their behaviour to eighteen carbohydrates. Quantitative analyses were made. By adding together the amounts of gas and of acid formed in the cultures the following results were obtained for the four groups of persons:

	Normal acid	*Hyper-acid*	*Hypo-acid*	*Achlor-hydria*
Amount of gas	45.8	64.0	60.0	71.0
Amount of acid	46.6	57.4	64.7	67.1

That is, the colon strains from cases of hyperchlorhydria show more activity in breaking down sugars than those from cases with normal gastric secretion. The colon strains from achlorhydric cases show still greater activity. This is because the bacteriostanins are not sufficiently produced in the small intestinal mucosa when the growth of colon bacilli is not inhibited in the stomach.

Now taking strains from cases of pernicious anæmia, the results were:

	Strains from		
	Stomach	*Duodenum*	*Colon*
Amount of gas	50.8	45.8	55.5
Amount of acid	61.1	57.2	79.1

The gas-quotient (ratio of gas-formation to acid formation) in the case of strains from non-pernicious anæmia cases is never over 1.0; whereas in pernicious anæmia it rises to 1.2 to 1.4. The latter strains can grow at a pH as low as 2.7, whereas ordinary strains are readily inhibited by low pH. The pernicious anæmia-coli strains are specially active formers of acid.

It is further shown that the distribution of coli in the gastro-intestinal tract is different in the four groups of normal persons, and also in cases of pernicious anæmia. In the latter the whole length of the tract exhibits a coli flora.

The next part of the work has reference to the behaviour of enterococci, streptococci and other organisms, and the effect of administration orally and intravenously upon the blood picture. A special type of diplococcus, which the collaborators name *diplococcus perniciosæ*, is considered in detail. It cannot be isolated when the patient has been on liver-treatment. The organism gives conclusive serum-tests, which no other coli strains yield, not even in achylic persons.

Finally, the findings in experimental work, using hundreds of white rabbits (as the only susceptible form of rabbit), are fully worked out, with complete differential leucocyte counts and red cell changes. The organisms were given by mouth and intravenously; normal strains, and strains from pernicious anæmia; finally the diplococcus perniciosæ and the enterococcus (always found, 90 to 100 per cent) in pernicious anæmia.) The effects are quite definite. (a) Normal *B. coli*: effect in 10 to 12 days is a hypochromic anæmia. (b) Ditto, followed by intravenous diplococcus p.: marked clinical symptoms, marked blood changes, high colour index. The changes cease when the diplococcus is withheld, and re-commence on resuming the injections. (c) Coli strains from pernicious anæmia, given alone, produce hypochromic anæmia in 10 to 12 days. (d) Diplococcus in addition produced marked clinical symptoms; marked blood changes with high colour index; death. The blood changes were much earlier (3 to 4 days). Megaloblasts appeared; great emaciation; bone-marrow like raspberry juice; multinucleate erythroblasts; Kupfer cells enlarged and contain iron. The enterococcus never produces such effects, which further emphasizes the importance of the new diplococcus.

	Action of Enterococcus	*Action of Diplococcus perniciosæ*
Maximum degree of diminution of red cells	18 per cent	50 per cent
Ditto of hæmoglobin ...	none	34.8 per cent
Megalocytes	none	present
White cell count	rises	falls
Emaciation and weakness	absent	marked
Recovery	good	no: fatal in 47 days

The conclusion is that here we have a causative organism which has specific features in culture, morphology, and biological actions. The note about white rabbits supports the idea that a constitutional factor (cf. achylia) plays a part in the causation.

O. C. GRUNER

Bancroft's Theory of Narcosis. Henderson, V. E. and Lucas, G. H. W., *Can. Chem. & Metallurgy*, 1932, **16**: No. 1.

The authors discuss the theory of narcosis proposed by Bancroft and point out how it differs from the original coagulation theory proposed by Claude Bernard. They show that, while Bancroft referred to his theory as a coagulation hypothesis, he uses the word with a somewhat different connotation from that usually employed, as he pointed out that, in certain cases, what he terms coagulation may occur without a visible change, but with changes in viscosity: and further, that he admits and seeks to prove that not only a change in cells leading to coagulation but a change leading towards peptization may also produce narcosis. The authors also point out that neither narcosis or anæsthesia is necessarily preceded by a stimulation phase, and that a complete depression of the response of tissues to stimulation cannot always be achieved by a narcotic agent, or even by an anæsthetic one, without producing irreversible change. They further experimentally retested Bancroft's proof that the effect of such narcotics as ether, amytal and morphine could be antagonized or reversed by the administration of sodium thiocyanate, and showed that while a temporary decrease in anæsthetic depth and an increase in respiratory rate could be produced by the administration of this drug, this depended upon sensory reflexes or changes of blood pressure which could be paralleled by other means, and that there is no evidence of an antagonism such as Bancroft suggests. Protocols are submitted as substantiating these points.

A. G. NICHOLLS

OBSTETRICS AND GYNÆCOLOGY

Therapeutic Abortion in Pulmonary Tuberculosis. Ingraham, C. B., *Am. J. Obst. & Gyn.*, 1932, **23**: 1.

Tuberculosis complicated by pregnancy is an exceedingly serious condition, on which authorities differ as to the best form of treatment. Forssner, of Stockholm, believes that pregnancy exerts very little influence on the course of pulmonary tuberculosis, while the German school recommends therapeutic abortion in the interests of the mother if the disease is detected before the fifth month of pregnancy. In the presence of an active lesion, Bridgman and Norwood, of Johns Hopkins Hospital, advise against interruption of the pregnancy, for the prognosis is made worse, and the child is sacrificed as well.

The author reviews the results of therapeutic abortion in 38 of his cases. His conclusions are that acute cases are not benefited by operation, death occurring in all such cases in the series. Fifty-seven decimal two per cent of those with a moderate lesion showed definite improvement after abortion, while 72 per cent of patients with a mild lesion were improved. The methods of induction used were simple curettement, a dilating bag followed by manual removal of the products of conception, vaginal hysterotomy, and abdominal hysterectomy. Where sterilization is advisable, the method advocated is the removal of a wedge of the fundus including the cornual ends of the tubes, under spinal anæsthesia. Therapeutic abortion is therefore recommended in active tuberculosis, save in the acute cases, since if pregnancy is allowed to continue the maternal mortality is in the neighbourhood of 50 per cent.

ELEANOR PERCIVAL

Treatment of Dysmenorrhœa by Exercise. Clow, A. E. S., *Brit. M. J.*, 1932, **1**: 4.

The diet, daily bath, and action of the bowels should be as usual. Active work is beneficial, as are outdoor games such as tennis and (ground) hockey, walking, riding, cycling and rowing. No extra rest is necessary during the period. The following movements are especially effective. They should be done for a quarter of an hour daily for a few days before the onset of a period, and especially on the first and second days of period. They should be done with enough vigor to promote a sensation of heat or a gentle sweat.

1. *Floor polishing*: kneel on "all fours". Swing right arm, with elbow stiff, through a semicircle, as if polishing the floor, reaching as far forward and as far back as possible. Repeat swing ten times with each arm.

2. (a) *Bending.*—Stand with feet apart. Stretch arms above head, bend forward and touch ground with knees straight. Return to first position. Repeat slowly eight times. (b) *Twisting.*—Stand with feet apart. Stretch arms to side on level with shoulders. Twist trunk round until right arm points directly backwards. Twist again until left arm points directly backwards. Repeat vigorously ten times. (c) *Swaying.*—Stand with feet apart. Stretch arms above

head. Sway body and arms to right, then left. Repeat slowly ten times.

3. *Rowing.*—Sit on the floor with knees straight and feet pressed against wall. Lean forward and touch wall with knuckles, allowing knees to bend slightly. Repeat rhythmically twenty times.

4. *Right to left and left to right.*—Stand with feet apart. Swing right arm up as far as possible. Bend down, bringing right arm over and touch left foot. Repeat six times. The same with left arm and right foot.

5. *Floor patting.*—Kneel, sitting back on heels. Twist body and tap floor with both hands four times on left side. Kneel upright. Twist body and tapping on right side. Repeat eight times each side.

6. *Bean picking.*—Throw twenty small objects, such as beans, on the floor. Pick up one at a time and place on a shelf above the head, using hands alternately. Do it as quickly as possible.

Immersion in a warm bath at night is not only salutary but checks or helps to prevent the onset of aching and discomfort. It is, of course, important to exclude appendix trouble before advising strenuous exercise, but caution in this respect is just as necessary during the intermenstrual period, and applies equally to both sexes.

ROSS MITCHELL

Puerperal Sepsis and Prophylactic Vaginal Antisepsis. Somerville, C. L., *Brit. M. J.*, 1932, **1**: 94.

Recent work has shown that in the apparently normal woman staphylococci are present in the vagina in about 60 per cent; streptococci in 42 per cent; the deadly *S. hæmolyticus* in 2.7 per cent; while other organisms, such as *B. coli*, are also present. Most forceps operations are conducted without any treatment whatever of the vagina. If the sterile fetus is dipped into the vagina during labour it becomes infected. If the infected fetus is withdrawn into the sterile uterus, the latter is also infected.

The natural corollary of these beliefs is that we should make some attempt to sterilize the vagina as soon as possible in labour, because when the head occupies the pelvic cavity a great portion of the vagina is out of our reach. The following technique is advised. A short length of rubber catheter is inserted as high as possible in the vagina, with due antiseptic precautions; through this 5 c.c. of a 2 per cent solution of mercurochrome in glycerin is introduced by attaching a 5 c.c. syringe filled with the solution. A sterile diaper is then applied to the vulva, and the patient is kept lying in bed for at least one hour (in those cases not yet advanced in labour). The mercurochrome is repeated each following morning, unless delivery is over. No irritant effects were observed and there is no danger to the infant's eyes.

In a series of cases (162 controls, 200 mercurochrome cases) there was an amazing reduction in the number of days total mortality for a whole year's working of the hospital as a result of this one addition to the technique.

ROSS MITCHELL

UROLOGY

Functional Incontinence of Urine in Women. O'Connor, V. J., *Trans. Am. Ass. of Gen. Urin. Surgeons*, 1931, **24**: 341.

That type of incontinence associated with relaxation of the vaginal outlet is well recognized and successfully treated, but there is another which presents similar symptoms, which is due to two factors. It is partially due to interference with the sphincter itself, and also to a sagging of the urethra and neck of the bladder as a result of weakness of the musculo-fascial sheet that normally supports it. One must, of course, exclude lesions which destroy tone, *e.g.*, tabes, arteriosclerotic cord lesions, etc.

The author's technique is a modification of Kelly's. The patient is placed in the lithotomy position, the post-vaginal wall retracted, and the cervix pulled down. A Young prostatic retractor is introduced, the wings opened, and the bladder floor is pulled downward and forward. An incision, 5 cm. long, is made in the anterior vaginal wall so that the centre of the incision is over the sphincter. By lateral blunt dissection the urethra and bladder neck are freed, the dissection being carried furthest along the palpable blades of the retractor which outline the vesical neck. The relaxed tissues adjacent to the blades are secured by three mattress sutures of chromic gut placed from side to side. The tractor is then removed and the sutures are tied separately. The firmer tissues on either side are also approximated by mattress wall sutures and the redundant vaginal cut away and sutured in two layers. A retention catheter is left in for a week. The operation has been employed 16 times with complete cure in 14, and practically complete in the remaining 2. Eleven of the cases had had children; in 4 the sphincter had been damaged by instrumentation, and in 1 the incontinence had come on after an automobile accident without local injury.

N. E. BERRY

Nephrostomy: Indications and Technique. Cabot, H. and Holland, W. W., *Trans. Am. Ass. of Gen. Urin. Surgeons*, 1931, **24**: 95.

The indications for nephrostomy are cases of obstruction which cannot be satisfactorily remedied by other methods and to prevent progressive injury to kidneys where incomplete obstruction favours the continuance of infection. The following types are specified:—

(1) acute obstruction of both or of a remaining ureter, as in calculous anuria or malignant disease of the lower ureter; (2) hydronephrosis; (3) large renal calculi. For some of these cases at least temporary nephrostomy may be desirable for the purpose of permitting re-adjustment between the pelvis and ureter, to allow recovery of renal function, and to aid in quieting infection. Particularly in the case of large bilateral calculi nephrostomy is a great aid in conserving function, and, it may be also, in preventing recurrence. (4) Cases of carcinoma of the bladder suitable for cystectomy. (5) In cases where there is great dilatation of ureters and pelves due to failure of the muscular apparatus nephrostomy may be relied upon to check further damage and perhaps allow for a measure of repair. (6) Certain cases of persistent infection. The operation is carried out with a view to avoid recurrent attacks and to allow some recovery.

The nephrostomy will be temporary or permanent, depending on whether or not the condition requiring the procedure can be remedied to a permanently satisfactory extent. Thus the nephrostomy for calculous anuria will be maintained until the obstruction has been removed and until the recovery of function appears satisfactory. The authors believe that nephrostomy is more satisfactory than pyelostomy in the majority of cases and equally simple when done by their method.

Thirty-three clinical cases, belonging to the various types noted above, are cited to show the application and the beneficial results to be derived from this procedure. The authors are particularly of the opinion that it may be of great help in preventing recurrence of stone.

The kidney is exposed in the usual manner. The pelvis is incised, and a bent uterine sound passed into the opening and out through the cortex at the point selected. The sound should be placed so as to drain the lowest calyx and leave the convex border of the kidney in such a way that the tube will lead straight from the wound and not be exposed to angulation as the kidney falls back into position. A piece of silk is attached to the bulbous tip of the sound in position and drawn through the kidney out of the pelvis, and is thus used to draw the drainage tube into position. The drainage tube is a winged catheter 22 or 24 F. The pressure of the tube controls bleeding and the tube is self-retaining. After two weeks a stilette is introduced and the catheter withdrawn. A straight No. 22 rectal tube is now introduced, and if passed at once to the same depth as the first tube subsequent changes become a very simple matter and drainage is most satisfactory.

N. E. BERRY

Tuberculous Infection of the Adenomatous Prostate. Patch, F. S. and Foulds, G. S., *Brit. J. of Urol.*, 1930, **3**: 269.

Tuberculous involvement of the prostate is rare, apart from its association with similar lesions elsewhere in the genito-urinary tract. Those cases which have been reported have practically all occurred in a prostate already the seat of adenomatous enlargement, despite the advanced age.

The authors have collected 14 cases from the literature. A summary is given of each and two case histories of their own are added. In only one case was the diagnosis of tuberculosis suggested before operation, despite the fact that in 7 tuberculosis was present elsewhere in the genital tract or elsewhere. In one autopsy the findings proved definitely that there was no tuberculosis elsewhere and in the remaining 8 no clinical evidence was established.

The most important point was the confusion with neoplasm which was noted in several cases of the series, particularly when indurated areas were encountered in the course of the prostatectomies. This happened in Young's two cases. It has been suggested that the presence of tuberculosis stimulated a precocious development of the abdomen, but most authors believe the tuberculous complication occurred in a fully developed adenoma. Eight of the cases operated upon healed uneventfully; in 6 convalescence was unduly protracted by inflammatory complications; and in 2 death occurred shortly afterward. The results would seem to indicate that under ordinary circumstances the prostatectomies would have been advisable had the tuberculosis been recognized and that the ordinary rules of operability should prevail. The routine examination of all prostates removed is urged as the only means of recognizing such a combination and of guarding against the unpleasant complications of healing which may occur. Such measures will include all forms of therapy, general or local, which are of value in the treatment of any type of tuberculosis.

N. E. BERRY

OPHTHALMOLOGY

Focal Infection: An Etiologic Factor in Diseases of the Eye. Lourie, O. R., *Arch. Ophth.*, 1931, **5**: 893.

"Since my arrival in America about nine years ago, I have been impressed with the extent to which focal infection, as the cause of many varied diseases, has become an obsession to the medical profession in this country. The removal of tonsils, teeth, appendixes, and gall bladders, all kinds of nasal operations, operations on sinus and pelvic organs, etc., in order to cure all kinds of human troubles, have become a rule. I deem it proper for a physician who has been in prac-

tice thirty-four years and has considerable experience, to say a few words against these exaggerations, which are not based on scientific proof and which are often harmful and sometimes dangerous to the patients. It is true that a systemic disease can be the result of a focal infection. Antisepsis and asepsis are based on this assumption. But what Billings, Rosenow and others try to prove is that any focal infection, whether acute or chronic, may become and usually does become the cause of a number of diseases that affect the human body."

Lourie concludes his article as follows. "The clinical observations that confirm the theory of focal infection are lacking in persuasibility. One must admit that in some cases of ocular diseases improvement or cure follows the extraction of teeth. But this fact is not sufficient in itself to prove that the ocular disease was due to infected teeth. It is probable that one could obtain the same beneficial result in a less objectionable way.

"In some cases of ocular diseases the improvement after elimination of the teeth may be coincidence; in some it may be due to bloodletting; and in some to the psychic impression that the extraction of the teeth must have on nervous people, especially those suffering from hysteria. In one of the cases mentioned in this article, where there was a tumour which pressed on the chiasm, the patient felt better after the extraction of the teeth. Some promoters of the theory of focal infection demand elimination of all foci. This means operations and operations and operations. But one has to remember there have been cases of death from extraction of teeth, tonsils and other operations. Iridocyclitis and chorioditis have followed the extraction of infected teeth.

"As for the theory of focal infection one must confess knowing that one does not know. There is no shame in recognizing the truth. It is true that the speculation of to-day may become the knowledge of to-morrow. But it is equally true that many speculations of the past have not become the knowledge of to-day, and have been buried in the waters of Lethe. Let us delay the practical application of the theory of focal infection until it has become knowledge."

S. HANFORD MCKEE

Retinal Tonoscopy in Hypertonus. Bidault, R., *Ann. d'Oculistique*, 1931, **168**: 255.

Relative arterial hypertension is often observed in general arterial hypertension, and its frequency is so much the greater in patients suffering from a high degree of hypertension that it appears to be related to the same causes as general hypertension itself. Its value is variable, the high figure being met with particularly in hypertension patients of high degree. The importance of these variations has not up to the present been demonstrated. It is almost constantly observed in hypertension subjects presenting ophthalmoscopic changes in the retinal vessels, or true retinal complications of arterial hypertension (except macular chorioretinitis). The frequent finding in simple hypertension, without general or ocular complications, does not appear to have any prognostic importance.

S. HANFORD MCKEE

L'hypertendu arteriel cephalique. Espildora, C., *Ann. d'Oculistique*, 1931, **168**: 923.

The importance of the measurement of the pressure of the retinal arteries in cases of cerebrospinal hypertension without papillœdema has been stressed by Kalt, Magitot and others. Using the method of Bailliart, the author examined the retinal arterial pressure in 18 patients who had symptoms suggesting the possibility of general arterial hypertension. In all cases it was raised while the general blood pressure was normal. In 14 patients the general physical examination was negative and in 3 there was a positive serological reaction for lues. The age-incidence varied from twenty-eight to seventy years, the average being fifty years. The symptoms may be divided into local and general. The local are: violent headaches (often nocturnal); vertigo; transitory visual disturbances, such as muscæ volitantes, luminous circles, flashes, transitory amblyopia; tinnitus aurium; epistaxis. The general are: intermittent claudication; transitory numbness of the fingers, hands or feet; character changes; amnesia.

Eye signs, with the exception of raised retinal arterial pressure, were generally absent. Nevertheless the following were observed: macular hæmorrhages; subconjunctival hæmorrhages; narrowed retinal arteries; optic atrophy; obstruction of the inferior branch of the retinal artery; retinal thrombophlebitis; retinal arteritis.

A large proportion of the patients were female and, as the author notes, the menopause as well as menstrual disturbances, *e.g.*, dysmenorrhœa, seemed to predispose to the condition. Espildora considers there is in this group a condition of hypertension affecting the internal carotid artery and its branches and does not doubt that such a state of localized hypertension can exist. One must be careful to exclude such conditions as paroxysmal hypertension, Quincke's disease, migraine and brain tumours.

H. A. DAVIS

NEUROLOGY AND PSYCHIATRY

Intracerebral Vascular Nerves. Penfield, W., *Arch. Neurol. & Psychiat.*, 1932, **27**: 30.

Many problems of normal and pathological cerebral physiology have remained unsolved because of lack of or incorrect information regard-

ing the vasomotor control of the intracranial vessels. Fresh assaults on the problem, with the aid of improving staining methods, have steadily improved the state of knowledge of the subject. The search has been getting "hotter and hotter" as one might say. The existence of a vascular nerve supply in the vessels of the pial and choroidal plexuses was definitely demonstrated by Huber and more recently by Stöhr, Köllicker, Hunter and Clark.

The author's clinical and operative experience with certain types of epilepsy insistently pointed to an intracerebral vascular nerve supply, and led him to fresh studies. With new staining methods devised by his technician, he has succeeded in demonstrating indubitably the existence of nerve fibres on all intra-cerebral blood vessels, with the exception of capillaries. These vascular nerves are very small, generally lose their myelin sheath as they leave the pia, and end in small grape-like clusters in the media of the vessels. The origin of these nerves is still in doubt, but it is evident that they do not all arise in sympathetic ganglia. The article is convincingly illustrated, and marks the solution of one more problem of both theoretical and practical importance.

A. T. MATHERS

Insanity and its Relation to the Parturient State. Solomon, B., *J. Mental Science*, 1931, **77**: 701.

The article contributed by the Master of the Rotunda Hospital is authoritative. At the outset he impresses the necessity of adequate instruction at puberty and prior to marriage, the "harmlessness" of "cousins' marriages", unless inbreeding continues into the next generation, the inadvisability of marriage and pregnancy where there is a family history of mental disorder. As for the incidence of puerperal psychosis, it is noted that the percentage of 0.15 at the Rotunda is somewhat higher than at Queen Charlotte's Hospital, where it is 0.08, closely approximating the figure for the Free State as a whole, *viz.*, 0.09. As to causes, the author casts doubt on the importance hitherto assigned to heredity; the influence of illegitimacy and the fear implanted by previous difficult labours are minimized also. Much more active as etiological causes are toxæmias, sepsis and chorea—the last mentioned infrequently.

The author, acknowledging his limited knowledge of psychiatry, refrains from any particular comment on symptomatology and classification. In treatment, careful nursing, prevention of self-injury, and large doses of bromide, morphine and hyoscine, are the only points, he believes. He is now assured of the value of venesection in toxæmic cases with marked albuminuria and hypertension. In his experience, recovery occurs in about 80 per cent of cases.

A. T. MATHERS

Frequency and Significance of Cerebellar Symptoms in Tumours of the Frontal Lobes. Hare, C. C., *Bull. of Neurol. Inst. of N.Y.*, 1931, **1**: 532.

Of fifty patients with frontal lobe tumours five had definite cerebellar symptoms. In all the patients with cerebellar disturbances there was bilateral involvement of the frontal lobes, while in 95.5 per cent of those without cerebellar symptoms (43 out of 45) only one frontal lobe was involved. These symptoms in patients with frontal lobe tumours are either the result of involvement of the fronto-ponto-cerebellar pathways, or produced by indirect pressure on the cerebellum. After consideration of all the factors involved the author concludes that the former is the cause. The fronto-ponto-cerebellar pathways originate well forward in the frontal cortex and converge, via the corona radiata, through the anterior limb of the internal capsule, thence through the medial part of the pes to the pons, where they enter into synaptic relation with neurones crossing to the opposite cerebellar hemisphere (a few to the ipsilateral hemisphere). If the pathway of only one side is involved that of the other side may compensate so that cerebellar disturbances will not occur, but if both pathways are more or less involved compensation may be impossible.

The occurrence of cerebellar symptoms in tumours of the frontal lobes is thus of significance both from the standpoint of diagnosis and from that of surgical treatment.

FRANK A. TURNBULL

A Study of Phobias. Paskind, H. A., *J. Neurol. & Psychiat.*, 1931, **12**: 40.

Different views as to causation are discussed. Déjerine and Gauckler hold that phobias in psychoneurotics occur as a result of the misinterpretation of various unpleasant or distressing sensations or experiences; that these phobias are accordingly understandable, logical and systematized; and that they have an adequate and obvious cause. Psychoanalysts, however, generally accept Freud's explanation which is briefly as follows.— If, in a predisposed person, the separation of an unbearable idea from its affect is undertaken for purposes of defence, the affect must then remain in the psychic sphere. The weakened idea remains apart from all association in consciousness, but its freed affect attaches itself to other not in themselves unbearable ideas, which on account of this "false" connection become obsessions and phobias. Methods of treatment vary according to the various theories as to causation. Ballet finds, for instance, that "the neurasthenic hypochondriac is amenable to reason"; Déjerine and Gauckler, that phobias are amenable to re-education and explanation; and the

Freudians, that explanation and reasoning are generally useless, and that the trouble must be eradicated by psycho-analysis.

In his study of 733 cases of phobias in psycho-neurotics, 672 cases of manic-depressive psychosis, and 644 cases of dementia præcox, Paskind comes to the following conclusions: Phobias in manic-depressive psychosis or dementia præcox can rarely if ever be dispelled by reason; they are illogical. In doubtful cases, this point, he maintains, is of value in diagnosing psychoneuroses from psychoses; also that phobias in the former can be dispelled by reason and re-education.

A. G. MORPHY

PHYSIOLOGY AND BIOCHEMISTRY

The Antirachitic Vitamin from Irradiated Ergosterol. Windaus, A. and Lüttringhaus, H., *Zeitschr. f. physiol. Chem.*, 1931, **203**: 70.

Ergosterol was irradiated with ultra-violet light from the magnesium spark, and when unchanged ergosterol was removed with digitonin, and inactive products condensed with citraconic anhydride, pure crystalline vitamin D was obtained (by O. Linsert). To this the name vitamin D_2 was given, but it now appears that the vitamin D_1 previously isolated was a compound of D_2 with an inert isomeric substance. The "new-calciferol" which the Medical Research Council laboratory at Hampstead obtained by purifying the product of high-vacuum distillation of irradiated ergosterol is identical with D_2. Vitamin D_2 is isomeric with ergosterol and melts at 114° C. The dose required to prevent rickets in rats is less than 0.00003 mg.; the toxic dose is 0.05 mg.

D. L. THOMSON

A Hormone produced by Sympathetic Action on Smooth Muscle. Cannon, W. B. and Bacq, Z. M., *Am. J. Physiol.*, 1931, **96**: 392.

A slight acceleration of the completely denervated heart of the cat occurs even when the adrenal medullæ have been extirpated and the liver and thyroid denervated. This is not due to changes in venous pressure or blood temperature nor to any organ that can be excluded experimentally, but the effect disappears when the sympathetic chains are completely removed. If the sympathetic chains are stimulated electrically near the root of the tail, all nervous connections with the head and thorax having been severed, there follows erection of hairs and constriction of blood vessels in a small area of the rump and hind limb, and the rate of the denervated heart increases. This last is ascribed to the action of a hormone, named "sympathin," which is set free when impulses reach sympathetic nerve-endings. Sympathin also causes secretion of the denervated submaxillary gland, dilates the pupil (after denervation of the iris), causes movement of the denervated nictitating membrane of the eye, and, in presence of cocaine, a rise in blood pressure. In these properties it resembles adrenaline, with which it may well be identical.

D. L. THOMSON

Preparation of Crystalline Antineuritic Vitamin from Yeast. Windaus, A., Tschesche, R., Ruhkopf, H., Laquer, F. and Schultz, F., *Zeitschr. f. physiol. Chem.*, 1932, **204**: 123.

The best preparation of vitamin B_1 hitherto obtained was that of Jansen and Donath, 0.009 mg. of which was an adequate daily dose to prevent polyneuritis (avian beriberi) in pigeons, but this contained inactive impurities. It was prepared from rice husks. With a similar method of purification, but using yeast as a starting-point, a crystalline preparation of vitamin B_1 has been obtained which is almost three times as potent as that of Jansen and Donath. The formula $C_{12}H_{17}N_3OS$ is tentatively suggested. Previous workers have not detected the presence of sulphur in pure preparations.

D. L. THOMSON

Hormones of the Corpus Luteum. Fevold, H. L., Hisaw, F. L. and Leonard, S. L., *J. Am. Chem. Soc.*, 1932, **54**: 254.

Corpora lutea from sows are extracted with acid alcohol; the extracts can be fractionated into three portions having different physiological properties. One fraction, insoluble in absolute alcohol, contains "relaxin", which causes softening and stretching of the pubic ligaments in the guinea-pig. A second fraction, insoluble in ether, causes the vaginal epithelium of the recently castrated rat to become vacuolated and rich in mucus. The third, an ether-soluble fraction, contains "corporin" or "progestin", which causes proliferation of the uterine endometrium in castrated rabbits. These physiological reactions are all similar to changes seen in pregnancy or pseudo-pregnancy in the various species. The corpus luteum therefore contains at least three hormones which can be separated from one another, although none have been obtained in a state approaching purity. [*Note:* The hormone of the corpus luteum which renders the rabbit uterus insensitive to pituitrin may be a fourth substance, or may be identical with relaxin; it is certainly different from progestin (Robson and Illingworth, 1931)].

D. L. THOMSON

RADIOLOGY

Roentgen and Radium Treatment of Hyperthyroid Conditions. Maisin, J., Goidsenhoven, F. Van, Vassiliadis, H., Jacqmin, L. and Steenhout, J., *Rev. Belge des Sc. Med.*, 1931, 3: 785.

The authors used in their series of cases a standard radium, and roentgen therapy. One treatment was given each week. The rays were directed tangentially, so as to avoid the larynx, and were filtered through 0.5 mm. of copper and 2 mm. of aluminum. A voltage of 160-180 KW. was employed. Twelve consecutive weekly treatments were administered. Two months after the last seance 6 to 8 more were given, according to the state of the patient. Each thyroid lobe was treated separately.

For radium therapy, a Columbia paste collar is used, upon which is laid 100 mg. in tubes of 5 mg. each, filtered through 1 mm. of platinum. It is necessary to dispose the tubes upon the surface of the paste in such a manner as to produce a homogeneous irradiation of the gland. Areas at the upper and lower limits of the collar should be left bare so as to avoid irradiation of the mandible and sternum. Usually 55 to 60 hours of irradiation will be sufficient and may be divided over a period of five to seven days. In severe cases, it is preferable to distribute the total dosage over twelve days. After the first treatment the patient is allowed to rest for two months. The usual case required three or four courses of treatment at intervals of two months in order to obtain a good result. Some, however, will do well after one treatment only, and others need as much as five treatments. Each case should be worked up thoroughly before being submitted to radium therapy and the basal metabolism readings should be repeated upon several occasions.

The writers consider that iodine is useless if radium therapy is intended, but if the patient has already received iodine it is safer to continue its use during and after the treatment. They believe that every type of case is suitable for this treatment, even those with cachexia or cardiac decompensation. During the first three weeks after the inception of treatment the symptoms persist or may be augmented. It is not rare to see only a feeling of fatigue following the use of radium. This period of reaction passes off and the patient starts to gain weight. The nervousness diminishes as the general condition improves. It is usual to have a similar reaction after the second treatment, but this is not as severe or as prolonged as the first.

The writers treated with roentgen rays 30 cases, of which 20 were exophthalmic goitre, 6 were toxic adenoma, and 4 were "formes frustes." Of the 20 exophthalmic goitre patients: 12 showed complete cure; 3 very great improvement; and 1 moderate improvement; 4 were not influenced by irradiation. They were subsequently and successfully treated with radium. All 4 refractory cases had very high basal metabolic readings, from plus 58 per cent to plus 95 per cent. The average basal metabolic rate reading of the cured and improved patients was plus 57 per cent, and after treatment this dropped to plus 5.5 per cent. The tremor, exophthalmos, glandular swelling, and body weight improved in most cases, but the tachycardia persisted in 50 per cent of the patients. Of the 6 toxic adenomas, 2 were completely cured and 1 much improved. The other 3 patients were not influenced, and were later submitted to radium treatment. The "formes frustes" proved less susceptible to this treatment, and of 4, 1 was cured and 1 greatly benefited. The other 2 were not influenced. Ninety-one patients were treated with radium, of whom there were 64 typical exophthalmic goitres, 16 toxic adenomas, and 11 "formes frustes". Among the 64 cases they had the following results:— cured 42; very greatly improved 6; greatly improved 5; improved 5 (of which 1 was ultimately operated upon); uninfluenced 1 (operated on later); deaths 5.

The authors discuss the dangers of radium therapy. They point out that, while 5 patients died within a few months of treatment these were all severe forms of exophthalmic goitre and, further, that 3 had received Lugol's solution immediately prior to the inception of irradiation treatment. Only one true case of relapse was encountered in their series. Cutaneous complications are similar to those found under roentgen ray treatment. Local achromias seem to be more frequent after radium treatment. Necrosis of the skin or bone following the use of radium cannot be foreseen. There arises, now, the question of the use of Lugol's solution in association with irradiation. Some observers, such as Loucks, consider it valuable but fraught with danger. The authors believe it to be a dangerous procedure and to be justifiable only in very grave cases. Finally, they state unequivocally that any case which does not respond to radium treatment should be operated upon without delay.

H. A. DAVIS

SPECIAL NEWS

ON TO ENGLAND — NEW LOW RATES

The Canadian Medical Association party going to England this summer will be glad to learn that an announcement has just been made to the effect that ocean rates have been reduced. This means $47.00 off tourist price and $68.00 off cabin price. To illustrate:

The $430.00 trip has been reduced to $383.00

The $540.00 trip has been reduced to $472.00

Further particulars may be obtained by writing to the General Secretary of the Association at 184 College Street, Toronto.

Obituaries

Dr. Alexander H. Beaton, of Orillia, died early in March, at the advanced age of 93 years. He was a well-known figure in Orillia for half a century and a recognized authority on teaching manual dexterity to feeble-minded persons. Doctor Beaton was an ardent curler, Past-President of the Ontario Curling Association, and for some time was chairman of the local collegiate board. For more than 50 years he was an elder of the Orillia Presbyterian church. He is survived by two sons and four daughters.

Dr. Arthur Everett Collins. Word was received in St. Catharines, Ont., of the death in Buffalo on February 24, 1932, of Dr. Arthur E. Collins, a former resident of St. Catharines and prominent as a player on the famous old Athletic Lacrosse Club in the period around 1880. Doctor Collins was a graduate of Victoria University in Medicine (1887) and formerly practised in St. Catharines.

Col. Robert Tyre Macdonald, M.D., one of the best known physicians in the Eastern Townships died on February 23, 1932, at the home of his son, Dr. Douglas O. MacDonald, Montreal. He was 83 years old.

Doctor Macdonald was born at Brockville, Ont., his father being Norman McLeod Macdonald and his mother Elizabeth Elliott Ogilvie. He graduated in Medicine from McGill University in 1881, and took up the practice of medicine at Sutton, Que., nearly sixty years ago.

During the Great War he served as a medical officer attached to District-Headquarters in Quebec City, and was, as a reward for his long service, promoted to the honorary rank of colonel. For more than forty years he served as chief surgeon of the eastern division of the Canadian Pacific Railway.

Doctor Macdonald is survived by his widow, formerly Miss Annie Elizabeth Boright, and by one son, Dr. Douglas O. Macdonald. Two other sons, Norman Macleod and Colin Campbell lost their lives during the Great War.

Dr. Duncan Hamilton McAllister died at his home, Broad Gables, Sussex, N.B., on March 6, 1932. Doctor McAllister was born in Belleisle Creek, January 18, 1872, the only child of the late Walter and Margaret McAllister. He was educated in Kings County Schools, Pictou Academy, and received his Doctor's degree at McGill in 1898. He had always practised in Sussex. He was a member of the Sussex Council and represented Kings-Albert in the Federal Parliament, 1908-11. Doctor McAllister's chief interest outside of his profession was harness racing and the breeding of Jersey cattle. He had a wide reputation as a surgeon and was of a most kindly disposition. He was probably one of the best known medical men in New Brunswick and had the ability of making friends in the widest possible degree. He had been ill for the last two years and finally died of pneumonia.

Hon. Dr. Robert Menzies Mitchell. The death occurred on February 7, 1932, in Weyburn, Sask., of Hon. Dr. Robert M. Mitchell, former Speaker of the Provincial Legislature of Saskatchewan, and later Superintendent of the Provincial Mental Hospital at Weyburn. Doctor Mitchell went West in 1899 and was a member of the Legislature of Saskatchewan for several terms. He married Margaret McKinnon of Osprey, Ont., who, with two sons, Chester and Donald, survives. One brother, Dr. J. M. Mitchell, lives in Collingwood, and another, William, in Toronto.

Dr. William Philp, who was the eldest medical practitioner in Ontario, died on February 8, 1932, at his home in Hamilton, Ont., aged 94.

Doctor Philp was born in Cobourg, and graduated in medicine from Victoria University in 1863. He first practised in Durham, then Waterdown, and finally came to Hamilton, where he remained until the time of his death. He retired ten years ago. On May 23, 1931, at Niagara Falls, he was awarded an honorary life membership in the Ontario Medical Association.

Last October he received also from Victoria University, Toronto, the silver medal and diploma he won for obtaining the highest honours in his class when he graduated in 1863. The college was not able to afford the medal that year, it was stated, and, through an oversight, Doctor Philp did not receive it until 67 years later. Instead of engraved diplomas, documents written in longhand were presented to the graduates, and this was one of the treasured possessions of Doctor Philp at the time of his death.

The Doctor had enjoyed excellent health, and time dealt lightly with him, until he became ill a short time ago.

Dr. John R. Philp, of Toronto, is a son.

Dr. Loftus Alexander Truman, of Hamilton, Ont., died on January 30, 1932, from pneumonia, following a week's illness. He was born 60 years ago on a farm near Strathroy and attended schools in that section and later went to the University of Toronto, graduating in 1905. He practised in Langton, Norfolk county, and remained there until twelve years ago.

Dr. James Walsh, the oldest practising physician in Prince Edward Island, passed away at his home in Mount Stewart, on February 26th, 1932, after a few hours' illness. Doctor Walsh came to Mount Stewart shortly after his graduation from the University of Pennsylvania (1877) and had been practising there continually since. His death will be mourned by a wide circle of patients and friends.

Dr. Henry Thomas Hadley Williams. As the result of a heart attack suffered a week ago, Dr. Hadley Williams of London, Ont., died on February 23, 1932, in St. Joseph's Hospital. He was born in Devon, England, sixty-eight years ago, and came to Canada when a boy. Graduating from the Western Medical College in 1889, he went to England, where he was made a Fellow of the Royal College of Surgeons. He was also an Honorary Fellow of the American College of Surgeons. During the Great War he offered his services to his country and was placed in charge of Orpington Hospital in England, which was established by the Ontario Government, with the rank of lieutenant-colonel. There his skill as a surgeon was again outstanding. Returning after two years' service, he was appointed consulting surgeon for Western Ontario to the Department of Soldiers' Civil Re-establishment. The degree of LL.D. was conferred on him by the University of Western Ontario two years ago. Doctor Williams was head of the Department of Surgery at the University of Western Ontario; examiner in surgery for the Ontario Medical Council, senior surgeon at Victoria Hospital, and a member of the staff of St. Joseph's Hospital. A golf enthusiast, he was well known through his participation in tournaments, and he had a private course built on his estate, "Windermere," in London Township. He is survived by his widow, Elsie Perrin Williams, a daughter of the late D. S. Perrin, wholesale confectioner and candy manufacturer; one sister, Mrs. David Cowan of Talbot Street; and a brother, Alfred B. Williams, of Phoenix, Arizona.

News Items

Great Britain

Fatal Poisoning from Gaseous Arsenic in Wall Plaster.—The inquest was resumed at Cinderford, Forest of Dean, last week, on the bodies of Roderick Turley and Miriam Turley, children of Mr. and Mrs. William Turley, of Blakeney. They died after a mysterious illness some weeks ago, and the parents and two other children were also affected. Professor H. A. Scholberg, of Cardiff University, who had conducted a post-mortem examination on Roderick's body, said that the cause of death was bronchial pneumonia and blood poisoning. The jury returned a verdict of "Death from natural causes."

At the inquest on Miriam Mr. R. H. Ellis, county analyst, described tests he had made on organs handed to him by Professor Scholberg. He found the total amount of arsenic in the organs of the body to be 2.65 milligrammes. He had visited the cottage in which the family had lived. There were definite evidences of arsenic present, some having been given off in gaseous form from the surface of the sitting-room, the walls of which were covered with mould.

Mr. Ellis stated that he removed a portion of plaster at a place where he had removed paper on which mould had been growing. He found that the plaster contained 91 parts per million of arsenious oxide. The spores of the mould attached themselves to the damp paper and grew vigorously, and these moulds had the power of generating a gaseous form of arsenic from the arsenical base on which they were growing.

The jury returned a verdict that death was due to dysentery and exposure to organic arsenic which was generated in the house in a gaseous form.—*The Weekly Times*, Jan. 28, 1932.

Vitamin D.—*The Lancet* reveals the fact that while British research workers, aided with public money, produced vitamin D by ultra-violet irradiation of ergosterol, British manufacturers were unable to apply the discovery because it was found that the British patent which had been issued to Professor Steenbock had been assigned to the University of Wisconsin. This made the British manufacturer liable to pay a royalty to that university, although the Steenbock patent vaguely covers a vague food process by irradiation. British abolition of all medical patents may result.

Royal College of Physicians of Edinburgh.—At a Quarterly Meeting of the Royal College of Physicians of Edinburgh, held on February 2, 1932, with Dr. Robert Thin, the President, in the Chair, Dr. James Douglas Allan Gray, Liverpool, Dr. John Gibb McCrie, Edinburgh, and Dr. Douglas Nairn Nicholson, Edinburgh, were introduced and took their seats as Fellows of the College. Dr. James Waters Thornton Patterson, Droitwich, Dr. Jacobus Johannes de Waal, Johannesburg, and Dr. William Lindsay Lamb, Aberdeen, were elected Fellows of the College.

Dr. Karl Friedrich Wenckebach, Vienna, was appointed the George Alexander Gibson Lecturer for 1932. Dr. James Crooks, London, and Dr. Henry Joseph Rodway Kirkpatrick, St. Andrews, were awarded the Kirk Duncanson Fellowship for Medical Research, for one year. Col. John Morison, I. M. S. Shillong, Assam, India, was awarded the Parkin Prize for the best essay on the curative effects of carbonic acid gas or other forms of carbon in cholera, the different forms of fever and other diseases.

The Osler Club, London.—At a meeting held on February 19th, Prof. Leonard Findlay gave an address on "The History of Rickets", copiously illustrated by books and papers. There was little evidence, he said, that human rickets existed in Egypt, either at the zenith of its civilization or during the Christian era. After briefly alluding to indefinite references in Homer, Galen, and Hippocrates, the lecturer mentioned in detail the first genuine description of rickets by Soranus Ephesius in the first century A.D. In 1645 Daniel Whistler published in Leyden a thesis entitled "De morbo puerili Anglorum", and five years later appeared Francis Glisson's monumental work "De Rachitide," in which for the first time the disease is brought before the profession as a clinical entity. John Mayow wrote that scabies or itching occurring in the course of rickets contributes much to its cure. Bibra in 1844 did the first chemical analysis of a rachitic bone. Concluding with a brief appreciation of modern pioneers such as Hopkins and Mellanby, Professor Findlay stressed the difficulty in early times of distinguishing between active and old rickets.

Mr. Warren Dawson, Prof. D. F. Fraser-Harris, Drs. E. W. Goodall, J. D. Rolleston, C. F. Harris, and Alan Moncrieff, and Mr. W. R. Bett spoke in the discussion.

W. R. BETT

The Royal Institute of Public Health will hold its Annual Congress in Belfast from May 10th to May 16th, under the Presidency of the Most Honourable the Marquess of Londonderry. Dr. C. S. Thomson, Chief Medical Officer of Public Health, Belfast, and Professor W. J. Wilson, Queen's University, Belfast, are the organizing secretaries.

The Scientific work of the Congress will be conducted in the following Sections:—

Section I. "State Medicine and Municipal Hygiene." Presidents: Sir Lynden L. Macassey, K.B.E., K.C., LL.D., D.Sc.; James Dunlop Williamson, M.D., Chairman of the Public Health Committee, City of Belfast.

Section II. "Industrial Hygiene." Presidents: The Lord Melchett; Thomas Somerset, M.P.

Section III. "Women and Children and the Public Health". Presidents: The Most Hon. the Marchioness of Londonderry, D.B.E.; The Viscountess Craigavon.

Section IV. "Tuberculosis." Presidents: The Right Hon. Sir R. Dawson; Miss Jane Walker, C.H., M. D. Bates, M.P., Minister of Home Affairs, Northern Ireland.

Section V. "Pathology, Bacteriology and Biochemistry." Presidents: A. Murray Drennan, M.D., F.R.C.P.E., Professor of Pathology, University of Edinburgh; Colonel A. B. Mitchell, M.B., F.R.C.S.I., Chairman of Committee, Royal Victoria Hospital, Belfast.

A program of the proceedings of the Congress, including full particulars regarding Receptions, Excursions and Special Educational Visits, can be obtained on application to the Hon. Secretaries, E. W. Hope, O.B.E., M.D., D.Sc., and T. N. Kelynack, M.D., M.R.C.P., J.P., 37, Russell Square, London, W.C.1.

Alberta

Representatives from the Alberta Federation of Labour appearing before the Compensation Act Inquiry committee urged upon the Provincial Government substantial increases in the scale of workmen's compensation. A resolution endorsed demanded a rate of 75 per cent of the earnings. They also requested increases in the amounts paid to widows and dependents of accident victims, the sum of $50.00 a month for the widow and $15.00, $12.00 and $10.00 respectively for the first, second and each additional child. In the event of less than 75 per cent of earnings being allowed as compensation, they asked that the total cost of medical and injured workmen should be borne by industries coming

within the scope of the Act. Among further suggestions it was agreed that the minimum payment to injured workmen should be $15.00 weekly and in the case of permanent disability not less than $90.00 monthly.

At the eighteenth annual meeting of the United Farm Women of Alberta, re-affirmation of the stand taken formerly on the question of state medicine, was embodied in a resolution which was once more placed on record as being "in favour of a system of state medicine." Among other subjects dealt with were the workings of the Alberta Eugenics Board, the Sterilization Act of 1928, the problem of birth control, the rights and privileges of chiropractors.

One might easily have believed that prosperity had once more returned to Calgary when one learned recently that a Chinaman who in two years' time rose from the rank of a common labourer to that of a wealthy "Chinese 'doctor'." The term "doctor" was self-designated for of medical lore he knew little unless it was that of the Orient. He had a shrewd knowledge of human personality and a still more shrewd estimate of the value of the coin of the realm. His fees ran from two to ten dollars and always in advance before the bottle of medicine was handed to the patient. There was undoubtedly an air of mysticism about this individual which appealed to the multitude for day in and day out hundreds thronged to be cured of real or imaginary ailments. His remedies had an occidental flavour, for one mixture analysed proved to be composed of fluid extract of cascara, fluid extract of licorice and simple syrup—harmless yet effective in many instances. It is almost beyond belief that this complacent, ingenious oriental had a cash income from his practice in 1931 of seventy-three thousand dollars and thereby hangs a tale for he was brought into court because of the wrongful declaration of the amount of his income to the federal income tax assessor. He was compelled to pay the full amount of his governmental dues. Two years ago this individual was arraigned before the local magistrate by reason of his having no license to practise medicine. Through the unfortunate circumstance of deficient evidence to convict him he was allowed to go scot free.

The recent death of Dr. H. M. Vango, at the early age of 36 from blood poisoning contracted through pathological work is universally regretted and especially by his Edmonton confrères. As Professor of Medical Jurisprudence and Assistant Pathologist at the University of Alberta he had already achieved a very high reputation and was destined, if he had survived to continue his work, to become one of the brightest lights of our profession.

Dr. R. B. Mooney, radiologist, is abroad in Europe at the Curie Institute. He anticipates being absent about six months. His work is being carried on, in his absence, by Dr. S. M. Rose, of Edmonton, formerly of Yorkton, Sask.

G. E. LEARMONTH

British Columbia

THE STRUGGLE TO MAINTAIN THE EDUCATIONAL STANDARDS OF THE COUNTRY IN THE TREATMENT OF THE SICK

In the Province of British Columbia an enquiry into Chiropractic and Drugless Healing has been concluded, presided over by the Honourable Mr. Justice Murphy of the Supreme Court of British Columbia, who has just issued his report. A history of the struggle of the medical profession in this province to maintain the educational standards of those who seek to treat the sick may be of some interest to medical men throughout the Dominion.

About the time of the Great War, and perhaps just before it, chiropractors began to come into British Columbia from the United States, as they doubtless did into every province in the Dominion. Their primary and secondary educational qualifications were practically nil. They based their claims, as they do now, for the right to be entrusted with the treatment of the sick on the amazing theory that all disease is the result of a misplaced vertebra which impinges on the nerve passing through the intervertebral foramen, resulting in the disease, whatever it may be. The cure is, of course, to reduce the so-called subluxation and Nature does the rest. Even infectious disease, we are gravely told by these people, will not occur in those whose spines are in proper alignment. Before the Commission just held it was stated that the subluxation for infectious disease may not always occur in the same region. This, briefly, is the chiropractic theory, as stated by their representatives in evidence to the Commissioner. Nothing else in the way of education, apparently, or very little, is considered necessary. When one of these gentlemen was asked in a recent inquiry in this province what preliminary education he had received, he replied with apparent self-satisfaction *that he had got into the third reader twice.* It was only natural then that the profession here, as elsewhere, viewed wih alarm the granting of the right to treat the sick, with all that that responsibility means, to men whose educational qualifications were a joke.

In 1921 and 1922, the chiropractors of British Columbia brought Bills before the legislature for their legal recognition. The principle upon which the medical profession took its stand was that no one should be allowed the right to treat the sick unless he or she possessed a fundamental knowledge of certain standard subjects. In other words, when these people showed knowledge and competency the profession had no desire to interfere with the particular line of treatment they desired to adopt, but a knowledge of the human body and the ability to recognize disease were held to be essential, and no one without these qualifications should be granted legal recognition. With these views, in 1921 and 1922, special committees appointed by the legislature to inquire into this question, agreed, and a special section was placed in the Medical Act providing for an examination on these subjects for chiropractors, and later on, drugless healers, who also became insistent for recognition. An Examining Board was also provided for, composed of three doctors and two chiropractors, or three doctors and two drugless healers, and it is interesting to note, from that date, not a single chiropractor or drugless healer has ever presented himself or herself for examination. The reason, of course, is obvious. They have little or no knowledge whatever of these subjects, and doubtless felt that there was no possibility of passing an examination before anybody competent to examine them.

The agitation, however, has continued, one demand being for an Examining Board of their own members—the blind examining the blind—their statement being that they refused to be examined by medical men who do not understand the chiropractic standpoint, whatever that might be, although it is a little difficult to understand how there can be one kind of anatomy, physiology, or pathology for chiropractors, and another for the medical profession. The human body is the same for us all, however much the mental processes may differ. However, since 1922, the agitation and demand for recognition has gone on and an enormous amount of energy and money have been expended and a great deal of time, both of the profession and the legislature, wasted, so that a year ago when further bills in the interests of chiropractors and drugless healers were brought before the legislature, in order to take this question out of

politics and put an end to the ceaseless agitation, the medical profession requested the government to refer the whole matter to a Commissioner, preferably a judge of the Supreme Court, upon whose report the legislature might act. To this the government finally agreed, the Premier stating that the bills would be withdrawn and he would refer the whole question to a Commission "which would go into the whole matter and examine every angle pertinent to this question". With this promise the profession was well content and waited the appointment of a Commissioner.

In August of last year, the Council of the College of Physicians and Surgeons was provided with a draft of the proposed commission, and was asked whether it were satisfactory. It was a simple wide-open commission which enabled the Commissioner, as had been promised, to go into all the questions necessary to enable the Commissioner to come to a conclusion on the matters involved regarding Chiropractic and Drugless Healing, and the Council replied that such a Commission was quite satisfactory. Shortly after this, the Honourable Mr. Justice Murphy was appointed as Commissioner, and I should like to take the opportunity of saying that no better appointment could have been made. Mr. Justice Murphy holds the respect and confidence not only of the medical profession but that of all shades of opinion in the province. A few days after this, the commission was issued and you can imagine the amazement of the medical men to find that, without any further reference to the Council, the commission had been radically changed—divided into two parts—one for chiropractors, which was so restricted as to make the inquiry a farce—and one for drugless healers, which was left fairly wide open. In the inquiry into chiropractic, as will be seen from Mr. Justice Murphy's report, he was absolutely prevented from going into the one question that really mattered, and of paramount importance, that is, *whether the qualifications these people possessed rendered them safe in the public interests.* On this point his report reads as follows.

"*Questions of the efficacy of Chiropractic or of its relative merit as compared with medicine were not open to be considered. In particular, no inquiry was to be made as to the adequacy or otherwise, from the standpoint of protection of the public, of the accepted chiropractic training for the diagnosis of disease, nor for the accepted chiropractic method of treating human ailments.*"

Mr. Justice Murphy went to some pains in his report to drive this fact home, and later on in the report, he reiterates it in order to make the limitations that had been forced upon him quite clear. "*Once more,* (he says), *to guard against misapprehension, your Commissioner repeats that the terms of the commission preclude him from making any investigation as to whether or not the Chiropractic standard in reference to the proposed subjects for examination, does adequately protect the public.*" In other words, Mr. Justice Murphy has gone to some pains to point out in his report that he was quite unable to bring out the one fact that ought to have mattered to the legislature of this province, or any other province, as to whether the qualifications of the members of this cult were of such a kind as to adequately protect the public. It may be wondered, with this question unsolved, because under the terms of the commission the Commissioner was effectively muzzled, how any legislature can point to this report in order to justify the granting of legal recognition to these people to treat the sick.

It naturally occurs to anybody interested enough to consider the matter why any government would appoint a Commissioner, and then under the terms of the commission effectively prevent his being able to bring out any salient facts from which he could present a real report. The painful fact is that under our present political system whenever it is considered that a sufficient number of people with a sufficient number of votes desire a thing it would appear to be extremely difficult to prevent it, even though it is recognized to be all wrong. It may well be asked, why in this country, where we are spending hundreds of thousands of dollars on higher education, and where, if our boys and girls desire to study medicine, they have to spend from seven to ten years before being considered safe to be entrusted with the great responsibility of treating the sick, our legislatures, from motives of political expediency, should be found apparently ready and willing to break down the educational standards of the country and grant legal recognition to those whose educational qualifications they know to be largely non-existent in any real sense.

A reference to Mr. Justice Murphy's report will be found to support everything that has been written above.

A. P. PROCTER

The Graduate Nurses Association of British Columbia held a refresher course for institutional nurses at the Vancouver General Hospital during the week of February 22nd to 27th. The classes showed an enrollment of 300, which is considered very gratifying. Lectures were delivered by Mrs. Mary Marvin Wayland, formerly of the School of Nursing of Columbia University, and now of California. Other features of the course were lectures by Dr. G. W. Weir, of the University of British Columbia, on "The art of public speaking," and by Dr. A. K. Haywood, Superintendent of the Vancouver General Hospital, on "Hospital administration." Doctor Weir made a plea for more comprehensive education in training schools for nurses.

Vancouver has been experiencing a small but exceedingly virulent epidemic of small-pox. At the date of writing there have been 38 cases, with 12 deaths. Vaccination has been carried out with a splendid response on the part of the public, and it is now evident that the outbreak is well under control. The anti-vaccinationists have been unusually conformable, and the absence of protests has been remarkable. No doubt the high mortality has accounted for this.

The Commission on Health Insurance has completed its investigations, and has reported to the Provincial Government. Copies of the report are not yet available, but it is understood that adoption of such insurance has been recommended. A short report from Victoria states that the introduction of such legislation will be urged at this session, but that the Government requires more time to investigate the financial obligations involved.

The Osler oration of the Vancouver Medical Association was delivered by Dr. F. P. Patterson, at a dinner on March 1st. This, which has become an annual event of importance in medical circles of the lower mainland, was one of the most memorable of the series. Doctor Patterson spoke on benign tumours of bone, the lecture being illustrated with lantern slides.

C. H. BASTIN

New Brunswick

The tuberculosis death rate in Saint John City for 1931 was 86.3 per 100,000 of population. This is certainly the lowest rate since vital statistics were compiled in New Brunswick. There were 41 deaths. The rate might appear even more favourable of non-residents dying in the city had been excluded from the figures.

The most recent Extra-mural Medical Conference in Saint John was addressed by Dr. Kirk MacLellan, of the University staff of Dalhousie. Dr. MacLellan spoke in Saint John at the request of the local Society and presented a most instructive address on the use of obstetrical forceps. This meeting was especially

arranged at the request of Dr. A. T. Leatherbarrow, who is the local executive member of the Department of Obstetrics under the Canadian Medical Association. It is planned to hold at least one meeting per year with an obstetrical viewpoint. The attendance at this meeting was extremely large and the discussion spirited. When the subject is of such universal interest and the speaker so well equipped as Dr. MacLellan, the value of such meetings is always enhanced.

The perils of rural practice in New Brunswick were well exemplified early in February when Dr. Donald W. Buchanan, formerly of Saint John, but now practising in Cambridge, Queens County, narrowly escaped drowning in the channel of the Saint John River. The Doctor's car crashed through a thin layer of ice and was submerged in about thirty feet of water. The Doctor was returning from Gagetown in a snow storm and only by extremely quick work was he enabled to open the door of the car and jump free. He fell into the water but maintained himself on a floating piece of ice until rescued. At about the same time, a physician practising in the northern part of the province, had the misfortune to be involved in an upset of his snowmobile. The accident confined him to his home for some days.

Early in February a disastrous fire at Hampton, New Brunswick, burned several buildings on the Main Street; included in these were the offices and apartments of Dr. A. T. Leatherbarrow. The fire occurred early in the morning and the Doctor was fortunate to escape without injury from the burning building. He lost his personal belongings, his extensive library, a good part of which was absolutely new, his surgical equipment, and a new microscope. The only pleasing feature of this unfortunate episode was the many kindly offers received by Dr. Leatherbarrow from his medical colleagues.

Dr. A. E. Logie, of Saint John, has been confined for more than a month to his home and later to the General Hospital by a severe attack of pneumonia. Dr. Logie is slowly convalescing, but it will still be some weeks before he is able to resume his practice.

Dr. C. G. Main, West Saint John, has the sympathy of his professional brethren in mourning the death of his wife. Mrs. Main was well known in Saint John and Saint Stephen where the Doctor had previously practised. In St. Stephen, Mrs. Main was an active member of the Ladies' Auxiliary of the Chipman Memorial Hospital.

A. STANLEY KIRKLAND

Nova Scotia

The establishment of the provincial nursing staff effective May 1st to work in connection with the department of Public Health was announced by Hon. G. H. Murphy in the local legislature. The staff will consist of nine nurses under the direction of a supervisor. They will cover the three health districts of the province, namely, Cape Breton, a central, and a western district. They will be working primarily under the tuberculosis examiners but will also be required to visit schools and homes.

Dr. W. M. R. MacKay, Psychiatrist, at the Nova Scotia Hospital, delivered a lecture recently before the Mental Hygiene Society of Nova Scotia on the principles of mental health. He pointed out that a changed outlook with regard to mental disorders had grown up. He regretted the fatalist attitude of the public towards mental diseases, and pointed out that affections of the nervous system should be regarded in the same light as other diseases, and further stressed that timely recognition of symptoms was all important in preventing serious nervous breakdowns.

The passing of Dr. Arthur W. Cogswell of Halifax, at the age of 70, removes a well known practitioner. The late Doctor Cogswell held both medical and dental degrees. On the death of his father, who was a dental surgeon, he decided to devote his attention chiefly to dentistry.

The Victorian Order of Nurses at their annual meeting on February 11, 1932, elected their officers for the following year: *President*, Mrs. W. H. Dennis; *Secretary*, Mrs. W. H. Conrod; *Treasurer*, C. Mitchell.

N. B. DREYER

Ontario

It has been decided to proceed at once with the new $300,000 surgical building for the Toronto Hospital for Consumptives near Weston. It is understood that this will be the first building in Canada with special facilities for the surgical treatment of tuberculosis.

It is planned to erect a four-storey addition to the Mercy Hospital for Incurables in Toronto, which is operated by the Sisters of St. Joseph.

The Fergus Town Council is sponsoring a private Bill to be submitted to the Legislature at the coming Session to permit the municipality to take over the ownership and management of the Royal Alexandra Hospital, and change its name to the Groves Memorial Hospital.

Within a few days construction work will commence on the five-storey addition to the Gravenhurst Sanatorium. This will provide for 440 additional beds at a cost of over $150,000. It is expected the new building will be completed in July.

It has been decided to commence immediately the construction of a two-storey wing to the Oshawa General Hospital.

Announcement was made by the Honourable Dr. J. M. Robb, Minister of Health, that arrangements have been made to loan Dr. E. A. Clark, a member of the staff of the Ontario Hospital at Hamilton, to the Prince Edward Island Government, to aid them in reorganizing their psychiatric services, and in the development of a mental health program.

The following hospital transfers have been announced by the Minister of Health: Dr. W. K. Ross, Superintendent of the Ontario Hospital at Toronto, retires on superannuation and is succeeded by Dr. W. C. Herriman, Superintendent of the Ontario Hospital, Cobourg. Dr. G. C. Kidd, Superintendent of the Penetanguishene institution, is being moved to Doctor Herriman's place at Cobourg, while his position at Penetanguishene will be taken by Dr. O'Gorman Lynch, Assistant Superintendent of the Ontario Hospital, London.

A meeting for the purpose of reorganizing the Leeds and Grenville Medical Society was held in Brockville General Hospital on Monday, February 15th. The meeting was a decided success. The following officers were elected: *President*, Dr. H. E. Preston; *First Vice-president*, Dr. W. J. Kerfoot; *Second Vice-President*, Dr. W. E. Throop; *Third Vice-President*, Dr. A. I. Armstrong; *Secretary*, Dr. F. M. Goodfellow; *Treasurer*, Dr. J. R. McAvoy. At the conclusion of the business session, Dr. L. J. Austin gave an address on "The lives and deaths of the Kings of France".

J. H. ELLIOTT

Quebec

A pleasing event took place on March 7th at the Cercle Universitaire in Montreal, when the sixtieth anniversary of the foundation of *L'Union Médicale du Canada*, the leading French-Canadian medical journal, was celebrated by a dinner. The company consisted of the Board of Directors and the Editorial Board of the journal, together with a number of guests, to the number of more than one hundred. Dr. J. E. Dubé, president of the Board of Directors, was in the chair, and the centre of honour was Dr. Albert LeSage, the Editor-in-chief. The toasts were the King, the Canadian Medical Press, *L'Union Médicale du Canada*, and the Hosts, which were eloquently proposed and replied to. Doctor Dubé was in good form and presided with his customary grace.

Dr. A. G. Nicholls, the Editor of the *Canadian Medical Association Journal* was the first speaker, replying to the toast of the Canadian Medical Press on behalf of the English profession, and was followed by Dr. J. E. Desrochers on behalf of the French. Doctor Nicholls commented on the fact which he had discovered that *L'Union Médicale* and the *Canadian Medical Association Journal* were actually of the same age. It was true that the latter, as the official organ of the Canadian Medical Association, dated only from 1911, but it could trace its ancestry through the *Montreal Medical Journal* to the *Canada Medical and Surgical Journal*, which, like its great French-Canadian contemporary, was founded in 1872. In this coincidence he saw a happy augury. Inasmuch as the two journals had the same ends in view and the same ideals they might very well cooperate in cementing still further the good understanding that now to some extent exists between the two great races of our Canadian people. He referred to the fact that the English journal had already made a gesture of friendship in appointing to its editorial staff two members of the French-Canadian profession, Drs. L. C. Simard, of Montreal, and P. C. Dagneau, of Quebec, and he hoped that the good relations that already existed between the two journals might continue.

Doctor Simard, on behalf of the Editorial Board of *L'Union Médicale*, in a happy speech, in which he characterized himself as the Benjamin of the Board, charged with the duty of extending its good wishes to Doctor LeSage, referred to the fact that there were there present three generations of French-Canadian medical men who had come to render homage to the man who had directed the destinies of *L'Union Médicale* for more than thirty years. What characterized the journal could be expressed in three words—*devoir, régularité*, and *constance*. The younger generation of to-day was not unmindful of the sacrifices and the devotion of the pioneers of the last century who had founded and nursed along the journal. On behalf of the Editorial Board, Doctor Simard then presented Doctor LeSage with a bronze head of a young woman, the work of one of our Canadian sculptors, symbolizing duty accomplished, recognition, and remembrance.

Doctor LeSage was also presented with a fine bronze bust of himself on behalf of a number of friends and admirers. In a feeling speech, full of reminiscences of the past days of the journal, he replied to the good wishes expressed by the several speakers who had preceded him, and gave a historical survey of the persons and times related to the foundation of the journal which he has so well edited. The founders of *L'Union Médicale* recognized that physicians as a body owed a duty to the public, consequently, they consistently advocated all measures looking to the common weal—vaccination, purification of drinking water, the inspection of food, the medical inspection of schools, the establishment of a provincial Board of Health, the care of mental diseases, the control of infectious diseases such as tuberculosis and venereal, the lessening of infantile mortality, with the result that official recognition was obtained for the measures necessary to protect the public health. The journal had supported the medical profession against the pretensions of charlatanism and unauthorized practice, and had assisted in the good work of hospital extension. Doctor LeSage remarked, also, that without the aid of *L'Union Médicale* the Canadian Medical Association would perhaps not have received the cordial welcome at its inception that it actually met with; had not the group of founders united with their French-Canadian colleagues to forge this splendid bond of union which does honour to the whole of Canada. The journal also was powerful in aiding the steps of another important medical body—L'Associations des Médecins de Langue Française de l'Amérique du Nord. It is now, also, one of the official organs of the University of Montreal. The progress of *L'Union Médicale* had been steady and notable. He thanked his friends for their expressions of esteem.

The Consul-general for France, M. E. Carteron, was present and offered some cordial and appreciative words, and a veteran of the profession, Doctor Foucher, gave some humorous reminiscences of the early days.

The gathering was characterized by great cordiality and enthusiasm and was a noteworthy recognition of an important phase of our Canadian medical history.

A recent visitor to McGill University was Dr. Franklin G. Ebaugh, Professor of Psychiatry at the University of Colorado. At the present time, Doctor Ebaugh is carrying on a study of psychiatric teaching in the medical schools of the continent for the National Committee for Mental Hygiene (U.S.A.), in which organization he is Associate Director of the Division of Psychiatric Education. Doctor Ebaugh spent three days at McGill University, meeting those in charge of psychiatric and mental hygiene teaching, and other members of the Faculty of Medicine.

Saskatchewan

The women members took charge of the program at the March meeting of the Regina and District Medical Society. Dr. Frances McGill gave a paper on "Recent advances in blood chemistry", Dr. Janet Henderson spoke on "The clinical application of blood chemistry", Dr. Lillian Chase gave a paper on "Blood sugar and blood cholesterol in diabetes mellitus" which was illustrated by lantern slides.

At the monthly meeting of the staff of the Regina Grey Nuns' Hospital Doctor Conn presented a case of subacute bacterial endocarditis in a young woman; streptococcus viridans had been isolated from the blood. Doctor Corbett presented a case of progressive anæmia with no evidences of blood regeneration in a young woman, marked by hæmorrhages from the gums; a normal clotting time, prolonged bleeding time. On admission the white blood count was normal, later it increased. A blood transfusion was without benefit. At the time of presentation her hæmoglobin was 12 per cent; she was drowsy; the spleen was somewhat enlarged but the liver was not; the heart was markedly enlarged and an aortic murmur was present; the blood Wassermann test was negative. No diagnosis was made.

Dr. H. H. Mitchell has been appointed superintendent of Regina General Hospital. Doctor Mitchell graduated from University of Toronto in 1910 and has practised in Regina since 1912.

The Health Unit at Gravelbourg has been closed. Doctor Hames, who has been in charge of the unit for the last few months, has been appointed to the staff of the Mental Hospital at Weyburn. LILLIAN A. CHASE

United States

The Third University Lectureship, California.—Dr. J. C. Meakins, Professor of Medicine and Director of the Department of Medicine, McGill University, Director of University Clinic and Physician-in-Chief, Royal Victoria Hospital, Montreal, was at the University of California Medical School as University Lecturer from March 11, 1932, to April 4, 1932.

The University Lectureship was established at the medical school in 1930. Each year a distinguished physician is invited to fill the post, which requires that the incumbent conduct clinics and demonstrations at the medical school during his month's incumbency.

In addition to medical staff conferences, two series of demonstration clinics were included, one for the fourth-year class and one for the third-year class. On March 22 Dr. Meakins participated in the medical school Alumni Day Program. On April 7 he also conducted a symposium at the annual meeting of the American College of Physicians in San Francisco on "Ten years' experience in the use of insulin."

The following Canadians have successfully passed the examinations held by the American Board of Obstetrics and Gynæcology and have received the diploma of the Board which certifies that they have been duly accredited on the basis of specialization and proficiency: F. A. Cleland, Toronto; W. B. Hendry, Toronto; H. M. Little, Montreal; W. A. Scott, Toronto; H. B. VanWyck, Toronto.

Johns Hopkins Medical School.—The twentieth course of lectures on the Herter Foundation was given at the Johns Hopkins School of Medicine on December 2, 3, and 4, by Dr. Major Greenwood, F.R.S., professor of vital statistics in the School of Hygiene and Tropical Medicine of London University. The general subject of the lectures was "The application of the experimental methods to the study of epidemiology."

The American Association for the Advancement of Science.—The thousand-dollar prize given each year by the American Association for the Advancement of Science "for a notable contribution to science," was awarded at New Orleans on January 1 to Dr. Carl Caskey Speidel, Professor of Anatomy of the University of Virginia Department of Medicine, for his studies of living nerve fibres.

General

Royal College of Physicians and Surgeons of Canada

The Royal College of Physicians and Surgeons of Canada desires to announce that the Annual Primary and Final Examinations for Fellowship in the College will be held in Toronto, October 10th to 15th, 1932.

Candidates desiring information with reference to examinations for the Diploma of Fellow are requested to communicate with the Registrar-Secretary, Royal College of Physicians and Surgeons of Canada, 184 College Street, Toronto.

The American Association for the Study of Goitre to be Held in Hamilton, Ont., June 14, 15 and 16, 1932.

PROGRAM

JUNE 14, 1932

7.15–9.30.—Hospital clinics.

10.00–12.00.—Dry clinic, Dr. Roscoe Graham, Toronto. Discussion: Dr. Graham, Cleveland; Dr. Jackson, Madison; Dr. Clute, Boston.

Lunch.

Dr. Shier, Pittsburgh; Dr. Rankin, Mayo Clinic, Rochester, Minn.; Dr. Rose, University Clinic, Philadelphia; Dr. Deneen, Bloomington, Ill.; Dr. Fahrni, Winnipeg; Dr. Rice, Minneapolis; Prize Award Essay; Dr. J. William Hinton, New York City; Dr. Eugene Potter, Ann Arbor. (20 minutes each).

Evening Meeting. — Dr. Naffziger, Professor of Surgery, University of California. Presidential Address: Dr. Shivers, Colorado Springs. Dr. C. H. Mayo, Mayo Clinic, Rochester.

JUNE 15, 1932

7.15–9.30.—Hospital clinics.

10.00–12.00.—Dry clinic, Dr. E. R. Arn, Dayton: Disappointing Results. Discussion: Dr. N. Percy, Chicago; Dr. K. Kinard, Kansas City; Dr. Murphy, Dixon, Ill.; Dr. Dorsey, Keokuk.

Lunch.

Dr. Andre Crotti, Columbus; Dr. Eberts, Montreal General Hospital, Montreal; Dr. Tinker, Ithaca, N.J.; Dr. Collip, Professor of Biochemistry, McGill University, Montreal.

Garden Party.

Annual Dinner.—Dr. George W. Crile.
The Presidents of: Royal College of Surgeons of Canada; Canadian Medical Association; Ontario Medical Association.

JUNE 16, 1932

7.15–9.30.—Hospital clinics.

10.00–12.00.—Dry clinic, Borderline Cases, introduced by Dr. J. K. McGregor and Staff of Hamilton General Hospital. Discussion: Dr. Barker, Baltimore; Dr. Plummer, Rochester, Minn.; Dr. Mosser, Kane, Pa.; Dr. Yung, Terre Haute.

Lunch.

Dr. John Oille, Toronto; Dr. Lewellys Barker, Baltimore (40 minutes); Dr. Pfahler, Philadelphia; Dr. Frank Lahey, Boston (40 minutes); Dr. A. Lockwood, Toronto; Dr. Deadman and Miss Graham, Hamilton.

The American Academy of Ophthalmology and Otolaryngology will hold its annual meeting this year from September 19th to 23rd. Headquarters will be the Mount Royal Hotel. Dr. Hanford McKee, of Montreal, is President.

The American Board of Otolaryngology will hold an examination, Saturday, September 17th, at the Royal Victoria Hospital. Prospective applicants should address the Secretary, Dr. W. P. Wherry, 1500 Medical Arts Building, Omaha, Nebraska, for proper application blanks.

Dr. L. G. Rowntree, President of the Alumni Association of the University of Western Ontario Medical School, and Professor of Medicine of the Mayo Foundation, has been appointed director of the newly-formed Philadelphia Institute of Medical Research. He will assume his new position next summer upon completion of the buildings now in the course of erection.

Doctor Rowntree graduated as gold medallist of his class at the University of Western Ontario in 1905, and after one year as an interne at Victoria hospital spent a year in general practice. He received an appointment on the staff of the Johns Hopkins Medical School as Assistant in Medicine, later as Instructor in Pharmacology and Associate Professor of Experimental Therapeutics. In 1916 he accepted the position of Professor of Medicine at the University of Minnesota and four years later a similar appointment at the Mayo Foundation of Rochester, Minn. Among his many researches the one that has brought him international recognition and that is being used routinely in clinical medicine is the phenol-sulphonephthalein test for kidney

function. It is known as the Rowntree test. Last year, he, along with Dr. A. M. Snell, published a work on Addison's disease which has received favourable comments from the profession. He is the author of another book, entitled "Volume of Plasma in Health and Disease."

Doctor Rowntree founded the "Rowntree Prizes" in medical history which are competed for by the medical students annually.

The Osler Oration will be given this year at Toronto on the evening of Wednesday, June 22nd. The speaker will be Dr. Francis R. Packard, of Philadelphia, and his subject, "William Osler in Philadelphia, and the School in which he taught".

Smallpox.—From the report of the Health Section of the Secretariat of the League of Nations we learn that in England and Wales out of over 3,500 cases under 15 years of age, 99.8 per cent had never been vaccinated. Even though England has had a mild type of smallpox, there were 28 deaths in 1930.

In Egypt in 1926 there were 2,677 cases of smallpox with 544 deaths. Nearly 16 million vaccinations were performed and by 1930 there were only 14 cases and no deaths.

India and Mexico report thousands of deaths from smallpox each year from largely unvaccinated populations.

The United States reported 42,282 cases of smallpox in 1929 and 46,712 in 1930 with a low mortality rate of 0.4 per cent.

Royal Canadian Army Medical Corps.—Lieutenants P. C. Gaboury, E. M. R. Casey, L. Ostiguy, C. S Thompson, G. G. Miller, J. J. Griffiths, W. E. Hume, H. D. Bayne, F. G. Thompson, D. H. Nichol, W. E Mace, H. B. Kenner, J. L. Duffy, V. A. Callaghan have passed the necessary examinations for the rank of Captain.

Lieutenant A. J. Skelley is posted to No. 24 Cavalry Field Ambulance, with effect from the 20th October, 1931.

Lieutenant C. M. Gardner is posted to No. 24 Cavalry Field Ambulance, with effect from the 12th November, 1931.

Lieutenant (Quarter-Master) E. S. Glasgow is posted to No. 32 Field Ambulance, with effect from the 1st December, 1931.

Book Reviews

Handbook of Medicine for Final Year Students. G. F. Walker, M.D. (Leeds), M.R.C.P. (Lond.), Late Medical Tutor and Registrar in the University of Leeds and the General Infirmary at Leeds, etc. 255 pp. Price 10/6. John Bale, Sons, and Danielsson, Ltd., London, 1931.

This little book is designed primarily, as its title states, for the benefit of final year students in medicine, but is well adapted also for the use of internes, specialists, and practitioners who find themselves in need of a "refresher." It meets this need very adequately. Laboratory procedures are not dealt with, and, while the author acknowledges the debt which the clinician owes to the laboratory expert, he points out, quite rightly, that laboratory reports should be taken only as aids in diagnosis, to be correlated with the rest of the evidence obtainable. Accordingly, "no attempt has been made to go beyond the scope of a practitioner armed with seeing eyes, sharp ears, deft fingers, open mind, and clinical perspective." The book opens with a useful consideration of the "clinical approach," which includes the general examination of the patient, the different systems, the urine, and the cause and significance of the common physical signs. The author insists on the supreme importance of making a complete diagnosis, if possible, as a guide to rational treatment, and, that this may be accomplished, the necessity of remembering what he calls "clinical perspective," the linking up of various phenomena in one coherent whole. Common symptoms and physical signs are discussed, and their significance set forth; the commonly met with diseases are dealt with objectively, in "tabloid" form, and useful summaries are given at the end of the book. Pitfalls in diagnosis are not forgotten. Helpful suggestions are given on how to study treatment. The book abounds in wise advice and clinical acumen. It is enjoined upon us to "hang everything on one pathological peg." All this is compressed into small space, yet has not suffered unduly in the process. The book meets a definite need.

The Diagnosis of Nervous Diseases. Sir Jas. Purves-Stewart, K.C.M.G., C.B., M.D., F.R.C.P. 7th Edition. Edward Arnold & Co., London, 1932.

This work has now reached its seventh edition. On each occasion of its re-appearance the material has been completely revised and much of the book re-written. This last edition has been no exception, and developments in neurological knowledge are presented in their newest form. Much of the material which was of special interest during and subsequent to the period of the Great War has been deleted. This loss is more than compensated for by a complete revision of the chapter on anatomy and physiology, postural reflexes, disorders of sleep and intracranial tumours, in all of which the very latest teaching is clearly set forth. ,The arrangement of the material in the book is unique. Instead of discussing diseases *per se*, the various chapters deal with outstanding symptoms, and the likely pathological lesions are deduced therefrom. In this way an extraordinary wealth of detail has been accumulated and arranged in the most practical and useful manner. Those unfamiliar with the work will be delighted with the abundant information and practical help to be found therein, while others will welcome it as an old friend in a very up-to-date dress.

The Heart and Spleen in Health and Disease. G. Arbour Stephens, M.D., B.S., B.Sc., Consulting Cardiologist, King Edward VII Welsh Nation Memorial Association, etc. 139 pages, price 7/6 net. H. K. Lewis, London, 1932.

This book is from the pen of a consulting cardiologist of Wales who began research on calcium metabolism and disorders of the heart in 1900. The present volume is written with a view to bringing under one cover the gist of these papers published from time to time in various journals.

In chapter one the author relates his theory in regard to the production of the heart sounds, and describes a modified stethoscope which is claimed to be superior to the ordinary instrument. In subsequent chapters he puts forth his views on blood pressure, the safety valve action of the spleen as a vascular reservoir, the cardiac arrhythmias; and the predisposing factors in acute rheumatism. In the final chapter evidence is presented in support of the claim that cancer is due to an inadequate supply of oxygen to the cells. He suggests that the treatment of cancer should be directed along the lines of increased oxygen supply to the tissues.

The book is full of novel and original ideas. The reviewer feels, however, that many of the theories might have been subjected to more searching scientific confirmation before publication.

The book will be read with interest by those who are familiar with the present widely-accepted views on the subjects discussed.

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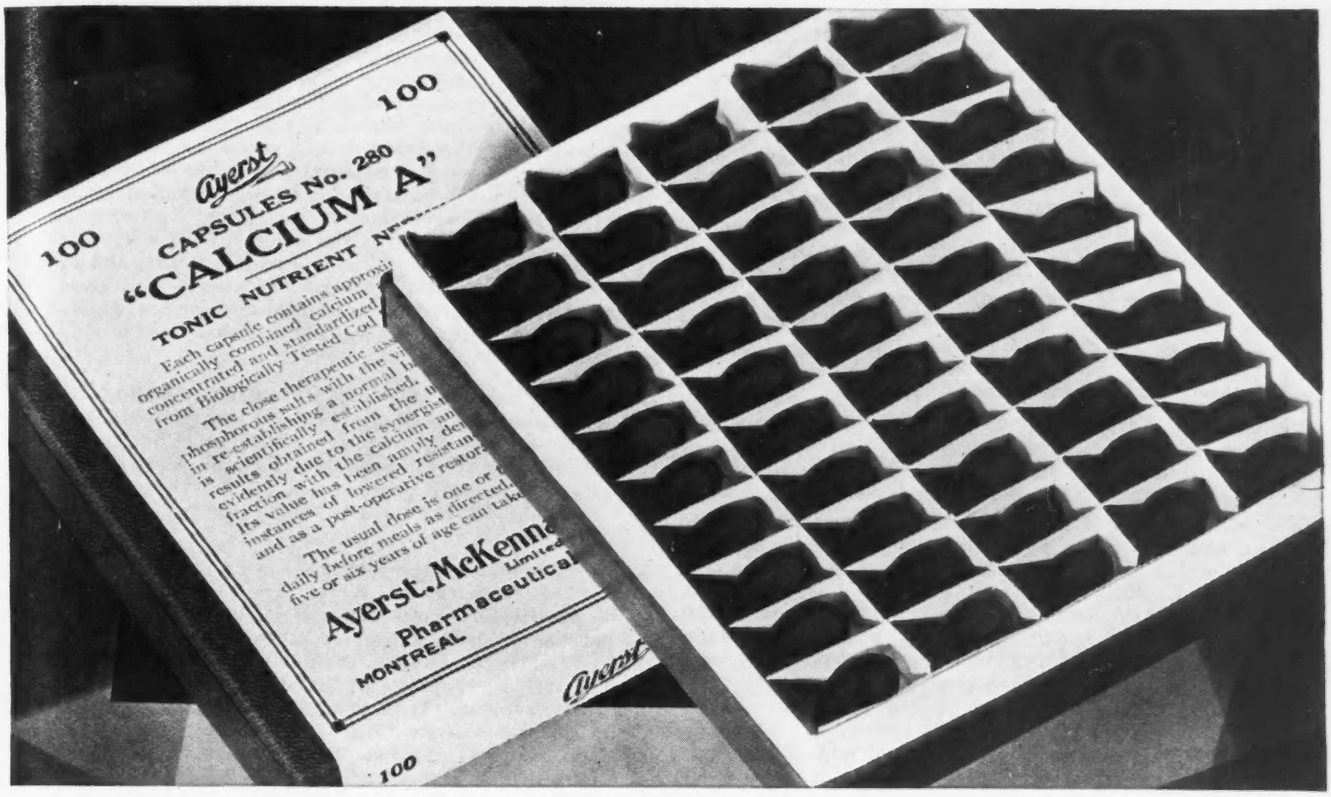

A STATEMENT *regarding the vitamin potency of* COD LIVER OIL CONCENTRATES

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The Principal Nervous Pathways. Andrew Theodore Rasmussen, Ph.D., Professor of Neurology, Dept. of Anatomy, University of Minnesota, Minneapolis. 73 pages, illustrated. Price $2.75. Macmillan Co., New York; Macmillan Co. of Canada, Toronto, 1932.

This is an admirable attempt to present in a readily accessible form diagrams of the principal nervous pathways. To each diagram is added a short explanatory text clearly and concisely written. Professor Rasmussen points out in his preface that he has had to accept certain connections as proved, in order to give completeness to some parts of the work. This in no way detracts from the value of the diagrams. For the busy practitioner and the medical student who wish to have diagrams of the nervous tracts for reference this book is excellent. It does not pretend to supersede neurological text-books, but rather to supplement them.

Cancer, What Everyone Should Know About It. James A. Tobey, Dr.P.H., Fellow, American Public Health Association. 310 pages and index. Price $3.00. Alfred A. Knopf, New York, 1932.

This book is presented as an "American treatise on cancer, written especially for the intelligent lay-reader", which doubtless accounts for the introduction by H. L. Mencken and Dr. Joseph Colt Bloodgood. Doctor Tobey justifies his book on the grounds that "In no other known malady is a complete understanding of it such an absolute necessity, because cancer is always a personal matter, a purely individual ailment." It may be said that Doctor Tobey has covered the subject and presented it in an interesting manner. The book is not depressing; it is hopeful, but it never fails to reiterate that early treatment is the only way to secure a cure. Some of his statements are rather sweeping—in a book of this type it is perhaps justifiable that they be so. These statements may be true, but can it be definitely stated "nor is cancer ever unduly prevalent in any one locality, unless it happens purely as a coincidence"? In certain parts of the book the author goes into more detail than seems necessary or advisable. There are statements made which the reviewer would question. Referring to inherited immunity, it is stated that "some 20 per cent of all children will be found immune to diphtheria". We are told that "Jenner discovered the efficiency of vaccination against smallpox in the middle of the eighteenth century"; actually he published his findings in 1798. Reference is made to "typhoid antitoxin", which "consists of dead typhoid bacilli", and it is further stated that it sets up "a passive immunity in man". Is it not typhoid vaccine which is meant, and does it not produce active immunity? We also read of "human toxin formed by the action of diphtheria bacilli". Canadian readers will be surprised to read that "Lord Atholstan in England is said to have offered a prize". The prize in question was definitely offered, and we claim Lord Atholstan for Canada. In spite of such errors in the text, the book will serve its purpose of dispelling misconceptions regarding cancer, and will give the lay reader a good general understanding of present-day knowledge of cancer. Above all, the book will emphasize the personal responsibility which exists of securing early, adequate treatment.

Psychology and Psychiatry in Pædiatrics: The Problem. Report of Subcommittee on Psychology and Psychiatry, Bronson Crothers, M.D., Chairman. White House Conference on Child Health and Protection. 146 pages, price $1.50. Century Co., New York & London, 1931.

This publication is the report of a subcommittee, and presents the question of the rôle of the medical practitioner in dealing with personality problems. In the opinion of the subcommittee, doctors must either be prepared and willing to give advice on such problems or else allow this field of work to be taken over by the non-medical group. Every child should be under medical supervision, and the doctor is in a position of natural power. The physician should not attempt to carry his prestige beyond the field where it was earned, as into education and psychology. The conclusion is "the problem will never be adequately solved until a very considerable number of general practitioners and pædiatricians become psychiatrically intelligent and educationally sensitive". There is presented the discussion of the report, of the work of a Child Guidance Institute, of a Juvenile Court, and of the Psychiatric Social Worker. The volume will be of interest to all practitioners of medicine, and will give them a good picture of their opportunities in the field of medical service for children.

Health Protection for the Pre-School Child. A National Survey of the Use of Preventive Medical and Dental Service for Children Under Six. White House Conference on Child Health and Protection. 275 pages, price, $2.50. The Century Company, 353 Fourth Avenue, New York City, 1931.

This volume is the report made to the Section on Medical Service of the White House Conference on Child Health and Protection. A survey was made of pre-school children living in cities, towns and rural areas in order to ascertain the number of such children "who had received four universally recommended health measures: (1) a health examination; (2) a dental health examination; (3) vaccination against small-pox; and (4) immunization against diphtheria." The results are given in detail and in the form of comparative charts and data. Great variations between places are revealed. Very few children receive health examinations after the first year, and only one child out of eight has been to the dentist for dental health advice and attention. Of the city children, 21 per cent are vaccinated, and only 7 per cent of rural children. The same percentage of city children are immunized against diphtheria, and 18 per cent of rural children have been given protection against diphtheria. This compilation of material will be appreciated by all who are interested in the health problems of the pre-school child, and adds another volume to the worthwhile publications of the White House Conference on Child Health and Protection.

Laboratory in Surgical Practice. E. C. Dodds, M.V.O., M.D., Courtauld Professor of Biochemistry in University of London, and Lionel E. H. Whitby, C.V.O., M.D., M.R.C.P., Bacteriologist to the Middlesex Hospital, etc. 187 pages, illustrated. Price $2.50. Constable & Co., London; Macmillan Co. of Canada, Toronto, 1931.

This monograph is unique in that it deals with the laboratory side of surgical practice which in so many text-books on surgery is sadly lacking. Evidently one of the designs of this book is to set a proper valuation on the laboratory as an aid in surgical work. The modern tendency is to place more and more dependence on the work of the biochemist as well as the bacteriologist, more especially where serious issues are at stake. Each will be able to give information which will often be of diagnostic as well as of prognostic value. Within the compass of this book there is a great deal of concise information. The authors have shown good judgment in leaving out non-essentials and have drawn on their extensive personal experience in dealing with each subject. They are conservative in their views, which enhances their opinions.

Among the subjects discussed are blood transfusion, specific therapy, operations associated with

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various pathological conditions, genito-urinary infections, renal function, investigations in diseases of the gastro-intestinal tract, biochemical investigations of the pancreas and liver, determination of the basal metabolic rate, exudates, transudates, body fluids, notes on various tests and on the collection of specimens for examination, laboratory techniques. There are references to many of the recent refinements of technique, including uroselectan B., which have proved of value in the determination of unilateral kidney function. The pyelograms shown are unusually clear. At the end of each chapter adequate bibliographical references are given. In the chapter on renal function, in the subsection on examination of the blood, no mention is made of preformed creatinin which undoubtedly has a prognostic value where there is impaired renal function.

To the surgeon who would have more than a working knowledge of biochemistry and of bacteriology this interesting volume will be of much value. To the laboratory worker there are many excellent points in technique which he can utilize since this monograph has been written by master technicians in this line of work.

Manual for the Jewish Diabetic. William S. Collens, B.S., M.D., Assistant Chief, Diabetic Clinic, United Israel Zion Hospital, etc. 138 pages, illustrated. Bloch Publishing Co., New York, 1931.

Though insulin is a most valuable drug, proper dieting is all that is necessary for the successful management of the majority of diabetics. Successful dietetic treatment, however, depends largely upon satisfying the patient both as to quantity and quality, with respect to the various food materials. Recognizing this fact, the author of "Manual for the Jewish Diabetic" has made an attempt to outline diets, the ingredients of which would correspond as closely as possible to the ordinary dietary habits of the Jew. As the latter represents an appreciable number of the total diabetic population, this manual should prove of value. This is the only excuse for this further addition to the many manuals now available, as in the pages allotted to the description of the disease the usual instructions for urinalysis, administration of insulin, etc., the author has added nothing new.

Courts and Doctors. Lloyd Paul Stryker. XXV and 236 pages. Price $2.25. Macmillan Co., New York; Macmillan Co. of Canada, Toronto, 1932.

The author of this useful little work was for many years general counsel for the Medical Society of the State of New York, and during that period had personal charge of the legal policy of the Society and the defence of such of its members as were sued for malpractice. He has put into book form the results of his experiences and researches in the legal aspects of this subject. The result is a book that all doctors may read with profit. It is true that the laws referred to are mostly those of the State of New York, with occasional references to those of other States, so that the usefulness of the work for Canadians and English is limited to that extent; however, there is an exposition of the principles of law that are applicable generally to the subjects of malpractice and the physician's responsibility which compensates for this. The relationship of doctor and patient is discussed, as well as the doctor's duty to the patient and the patient's duty to the doctor. Some helpful advice is given to the doctor when he becomes a witness in a court of law. The proper character of the medical expert is laid down with some pertinent observations relative to expert evidence. Brief chapters deal with the doctor in his relation to criminal law. Actual cases are cited which illustrate the various points considered. We thank the author for his kindly and appreciative estimate of the character of the medical profession as a whole, and for his defence of the profession against the pretensions of the many species of quacks and the attacks of the ungrateful and unscrupulous.

History of Medicine in the United States. Francis R. Packard, M.D., Editor, Annals of Medical History. Vols. 1 and 2. 1348 pages, illustrated. Price $12.00. Paul B. Hoeber, Inc., New York, 1931.

In 1901 Doctor Packard published a work, now out of print, on the "History of Medicine in the United States" bringing his subject matter down to the year 1800. The present history covers that period and brings the record down to the end of the nineteenth century. So much has been discovered and published relating to the earlier period that the former work has been practically rewritten. Keen on medical history, with a wide knowledge of his subject and source records, Doctor Packard has written an authoritative history, well documented, and at the same time a book which will delight the student and the casual reader. It can be read with pleasure by the layman as well as the physician, and many will wish to refer to it for the accurate and extensive information given regarding special subjects discussed under their special headings. The first volume deals extensively with prerevolutionary medicine, epidemic sickness and mortality in the English Colonies, witchcraft, medical legislation, education and publications, early hospitals, the medical profession in the war of the revolution and a history of the medical department of the army to the close of the Spanish American war. The second volume deals with the medical department of the navy, the medical schools, the development of practice and education in various states, a discussion of foreign influences on American medicine, and records some notable events in medicine and surgery with the beginnings of specialism. Some special subjects appear as appendices, and there are eighty pages of bibliography and index. The value of the work is greatly enhanced by the 103 illustrations, which are unusually well chosen for their purpose.

The book is a mine of information throughout and fascinates the reader, whether a student of a particular period, of some particular phase of medical education, of hospital development, or whether a casual reader seeking for sheer enjoyment. There is no other work which covers the subject in a similar manner. It should find a place in every medical library and on the shelves of every physician interested in the history of medicine in the United States.

BOOKS RECEIVED

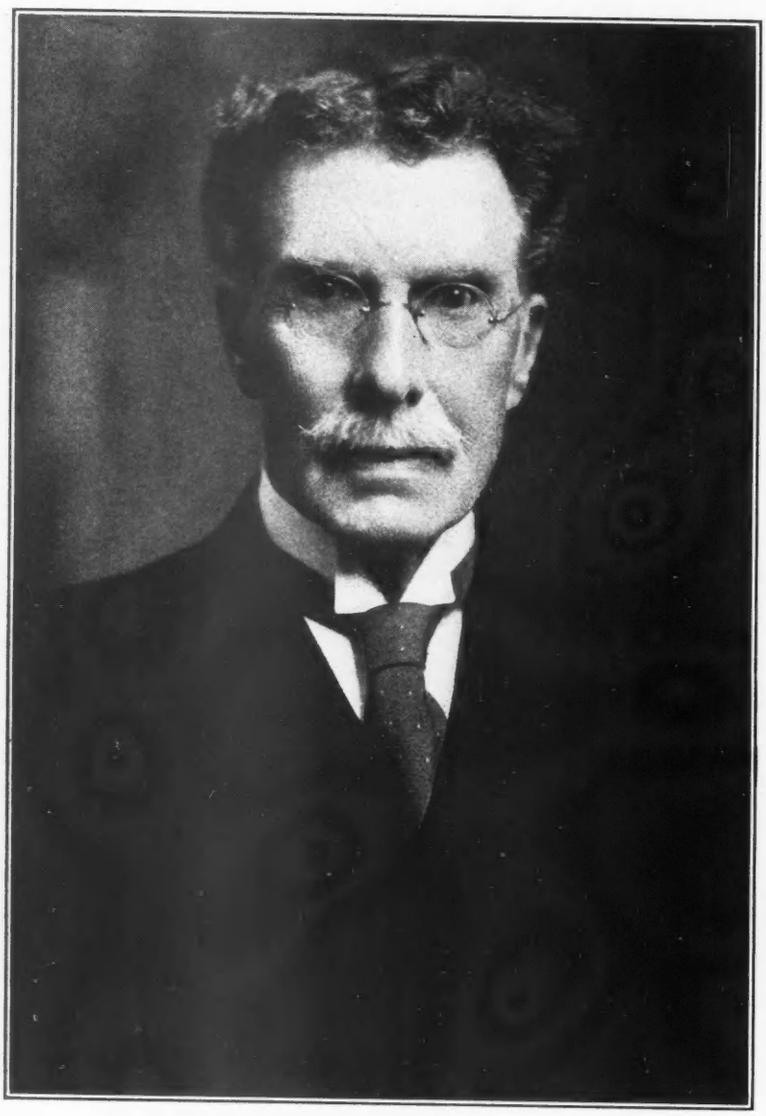
How's Your Blood Pressure? Clarence L. Andrews, M.D., Attending Physician and Medical Chief at the Atlantic City Hospital. 224 pages. Price $3.00. Macmillan & Co., New York; Macmillan Co. of Canada, Toronto, 1931.

The Human Voice, Its Care and Development. Leon Felderman, M.D. 301 pages. Price $2.50. Henry Holt & Co., 1 Park Ave., New York, 1931.

Annual Report of the Surgeon General of the Public Health Service of the United States, 1931. 354 pages. Price 85c. Published by United States Government Printing Office, Washington, 1931.

Surgical Clinics of North America. By leading surgeons. Vol. 11, no. 6, December. Issued serially, every month. 300 pages, illustrated. Price $18 (6 nos.). W. B. Saunders, London and Philadelphia; McAinsh & Co., Toronto, 1931.

Medical Clinics of North America. Vol. 15, no. 4. Boston number. 300 pages, illustrated. Issued serially, every other month. Price $18.00 (6 nos.). W. B. Saunders, Philadelphia & London; McAinsh & Co., Toronto, 1932.



W. D. Blackader